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(54) **FIBER BODY HOLDER AND STRAIN RELIEF DEVICE**

(71) Applicant: **Corning Cable Systems LLC**, Hickory, NC (US)

(72) Inventors: **Monique Lise Cote**, Ft. Worth, TX (US); **Brent Michael Frazier**, Haslet, TX (US); **William Julius McPhil Giraud**, Azle, TX (US); **Raymond Glen Jay**, Mansfield, TX (US); **Brian Duane Kingsbury**, Watauga, TX (US); **Michael Heath Rasmussen**, Keller, TX (US)

(73) Assignee: **Corning Cable Systems LLC**, Hickory, NC (US)

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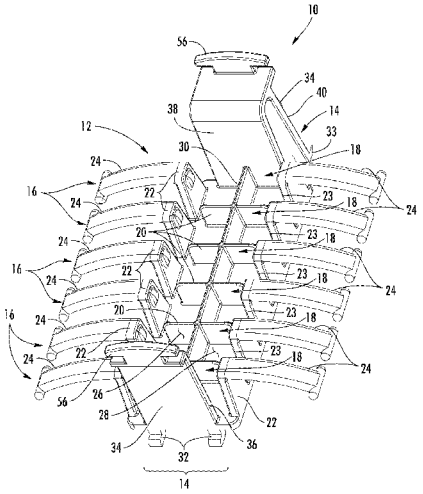
(57) **ABSTRACT**

A fiber optic apparatus including a retainer assembly having at least one retainer configured to toollessly, releasably retain a fiber body and or one or more optical fibers is disclosed. An attachment feature may toollessly, removably attach the retainer assembly to a mounting surface. The at least one retainer is configured to releasably retain the fiber body via mounting bosses on the fiber body. A stacking feature may be configured to removably attach a second retainer assembly to the retainer assembly. The at least one retainer may be configured to releasably retain the one or more optical fibers to strain relief the one of more optical fibers. The mounting surface may be fiber optic equipment. The fiber optic equipment may be a shelf mounted to a chassis in a fiber optic equipment rack.

31 Claims, 24 Drawing Sheets



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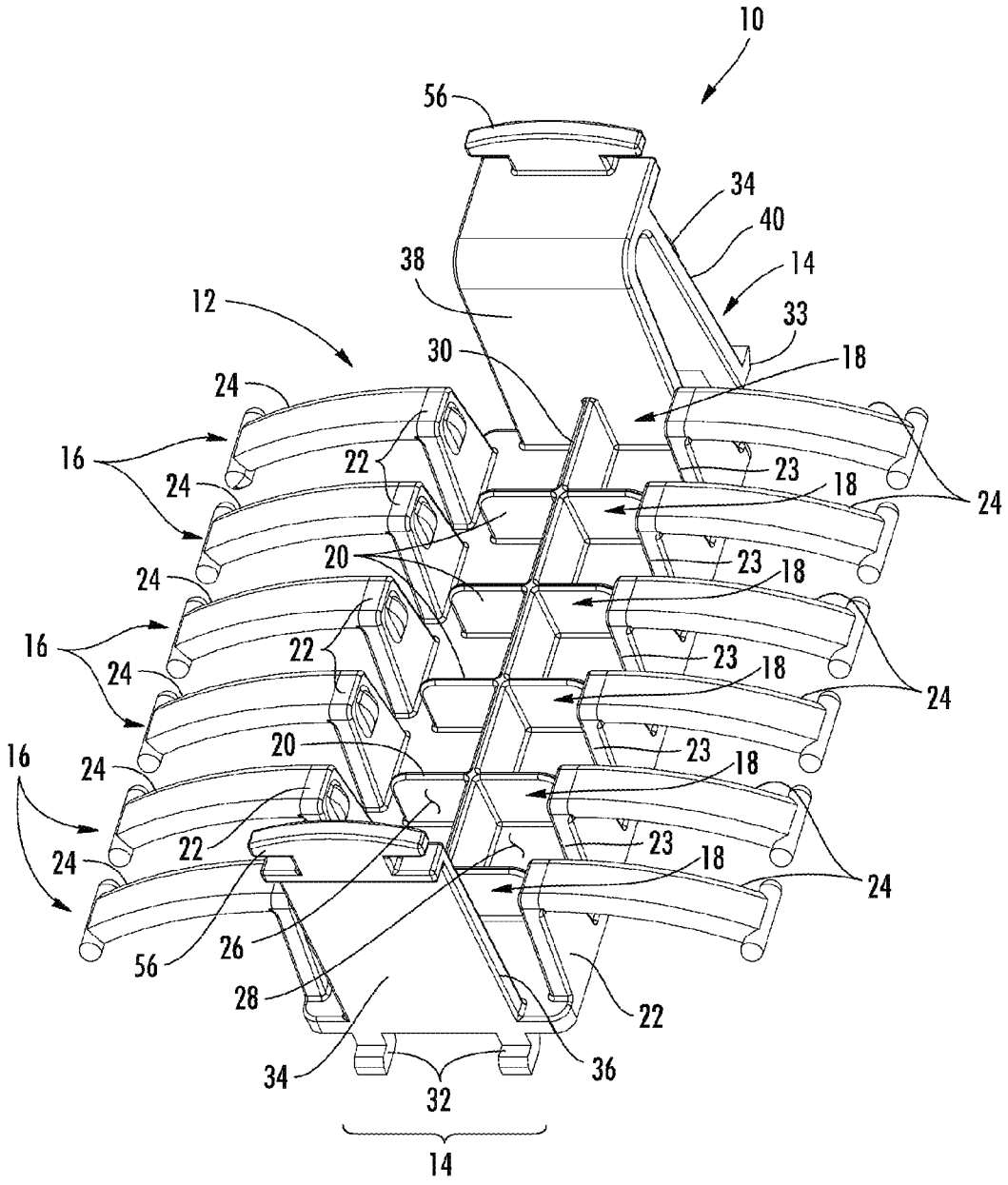


FIG. 1

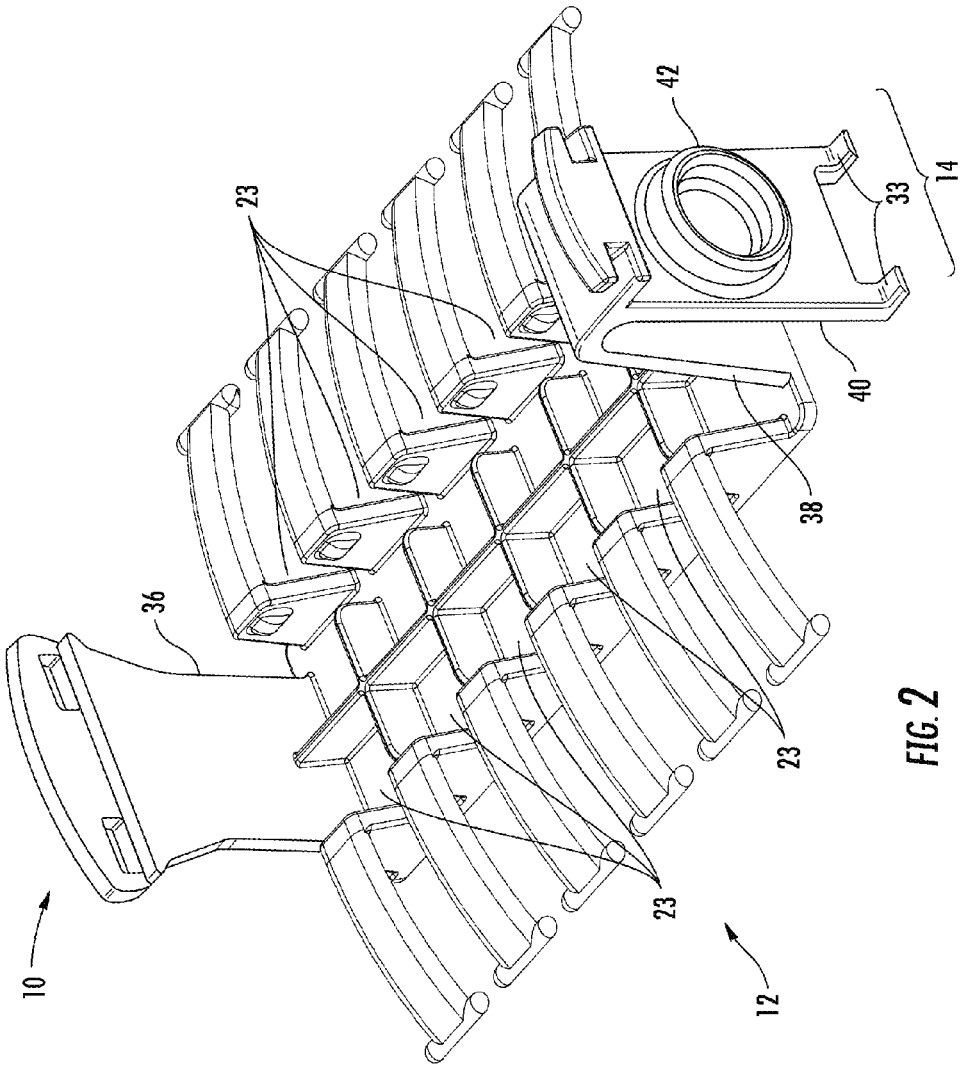


FIG. 2

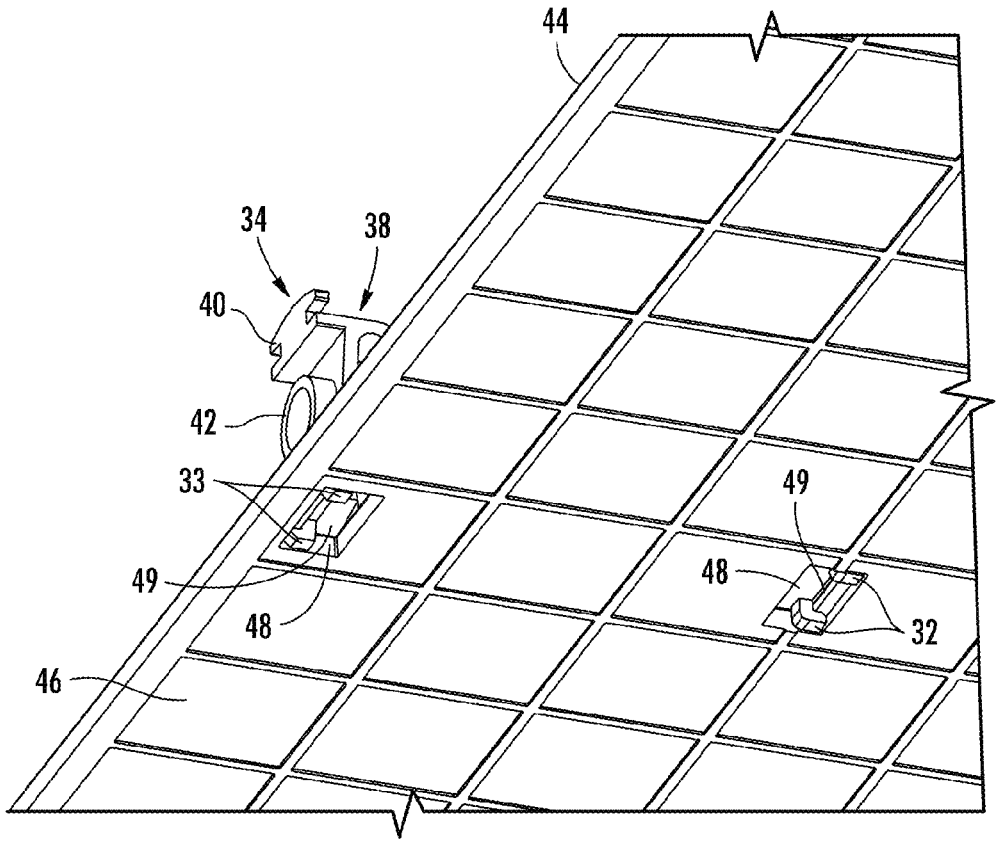


FIG. 3

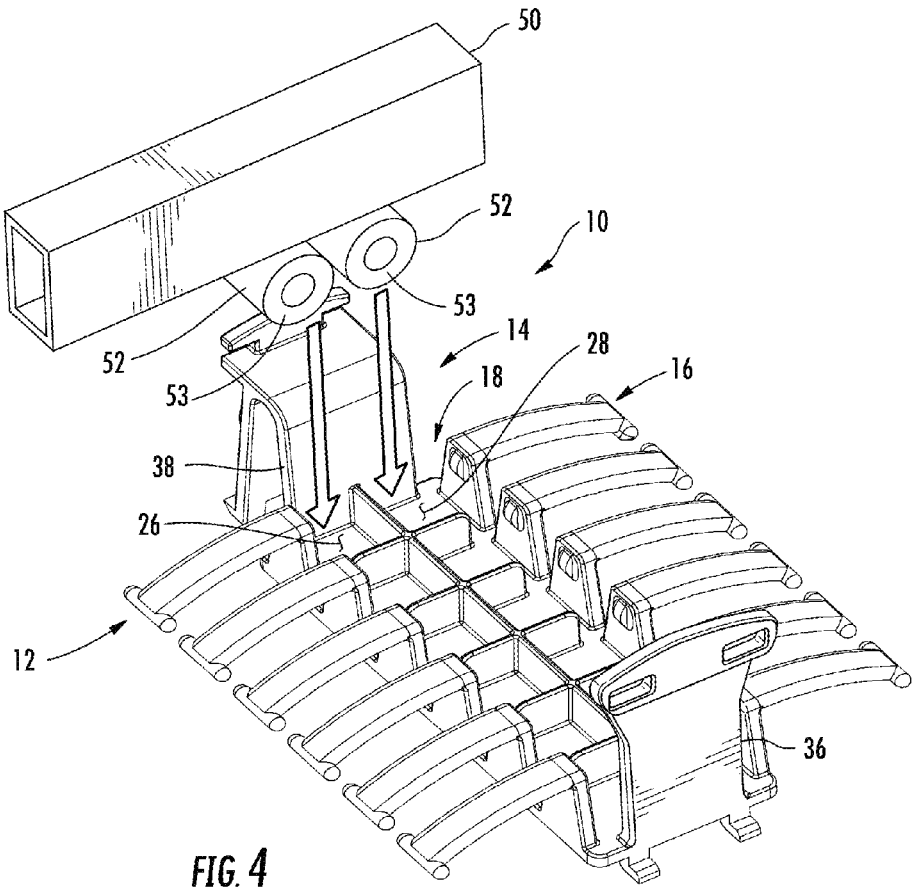


FIG. 4

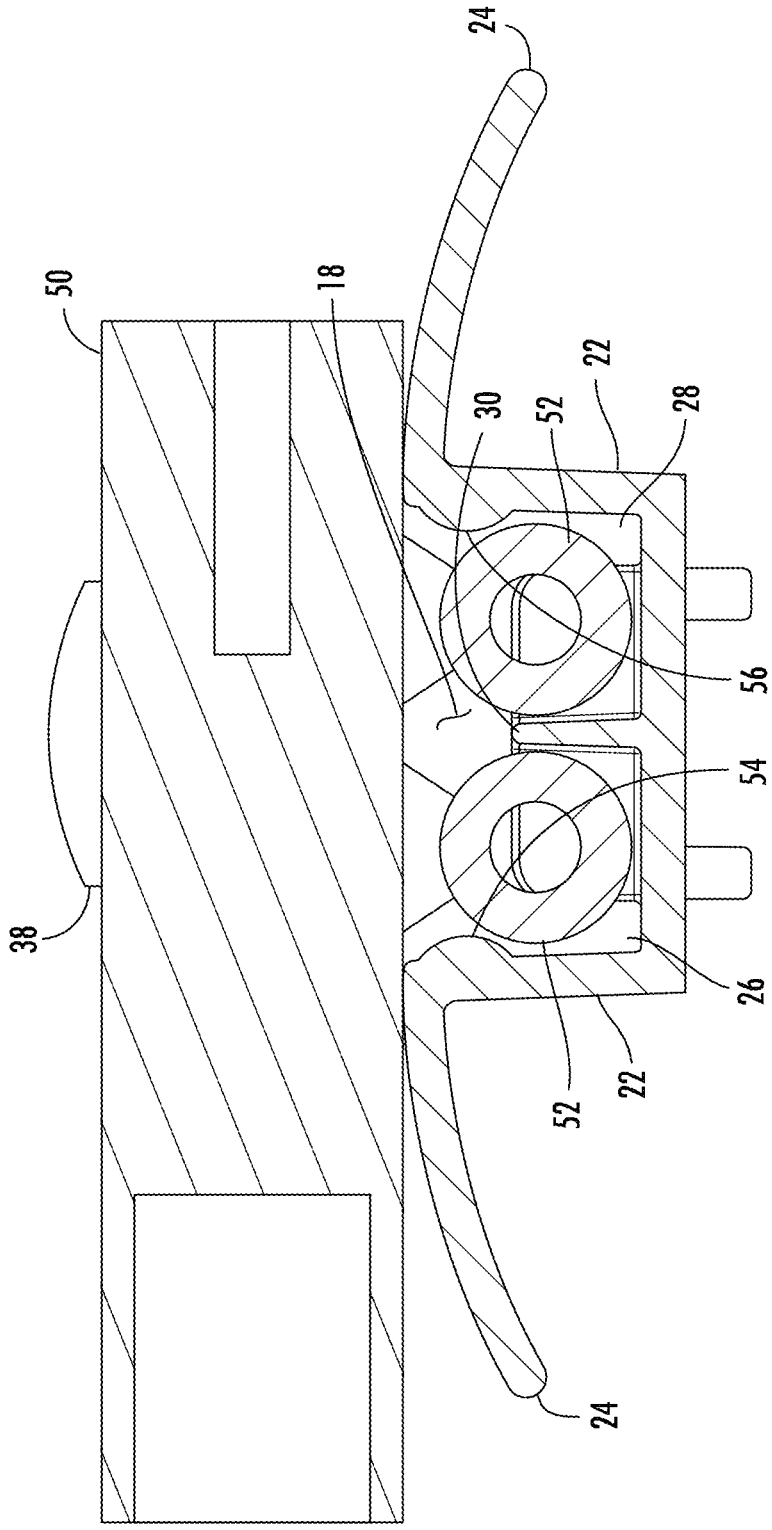


FIG. 5

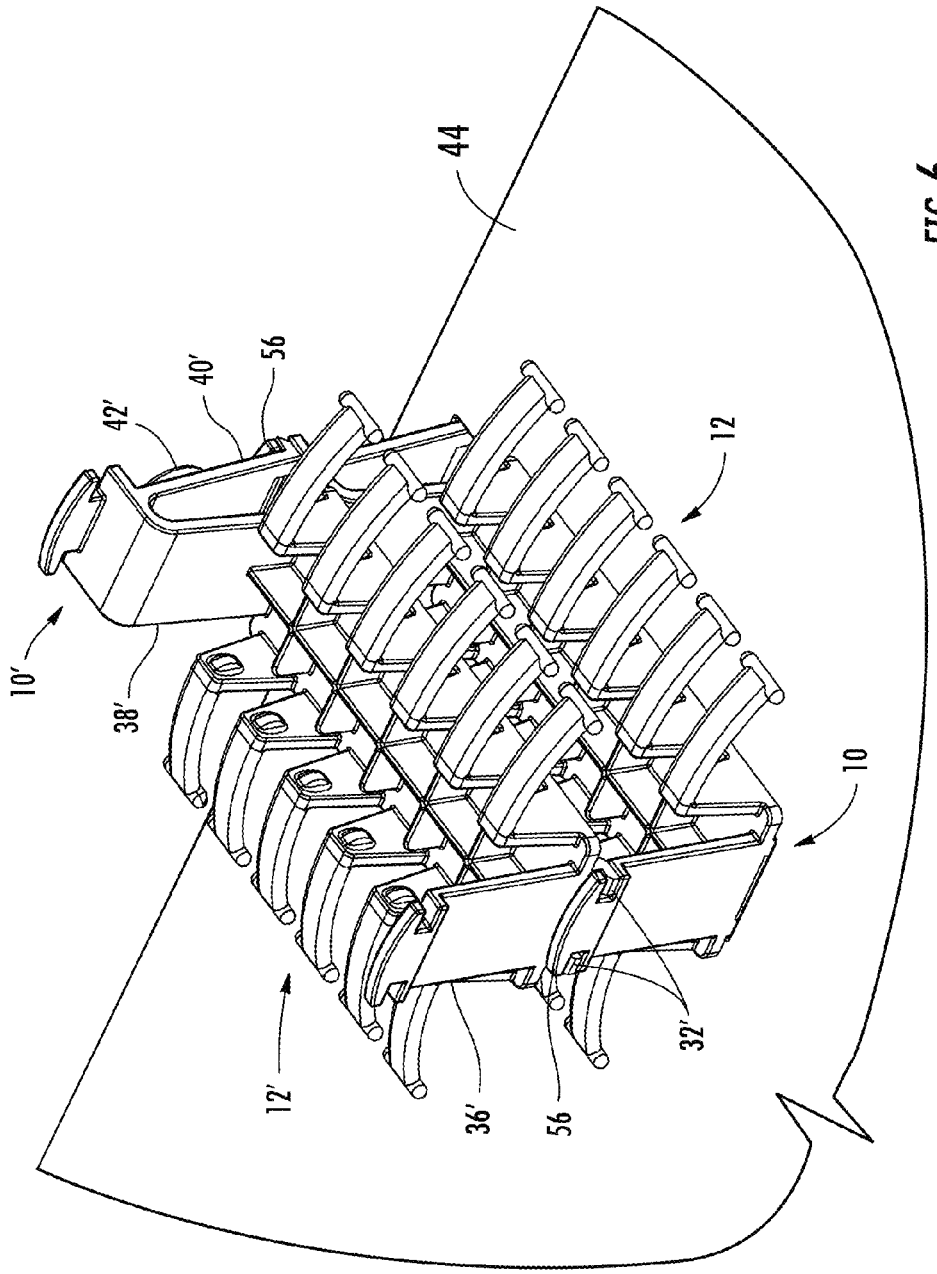


FIG. 6

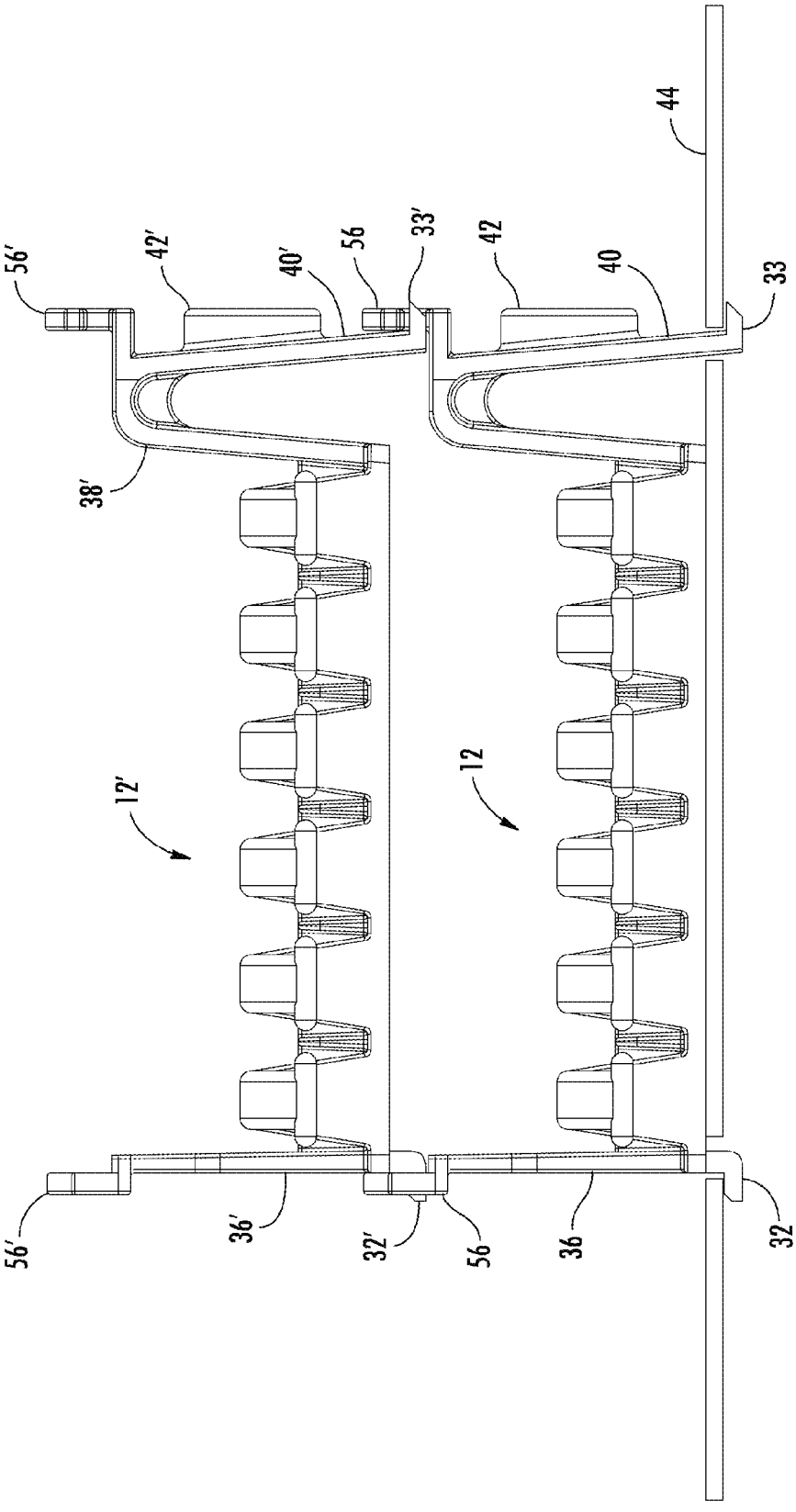


FIG. 7

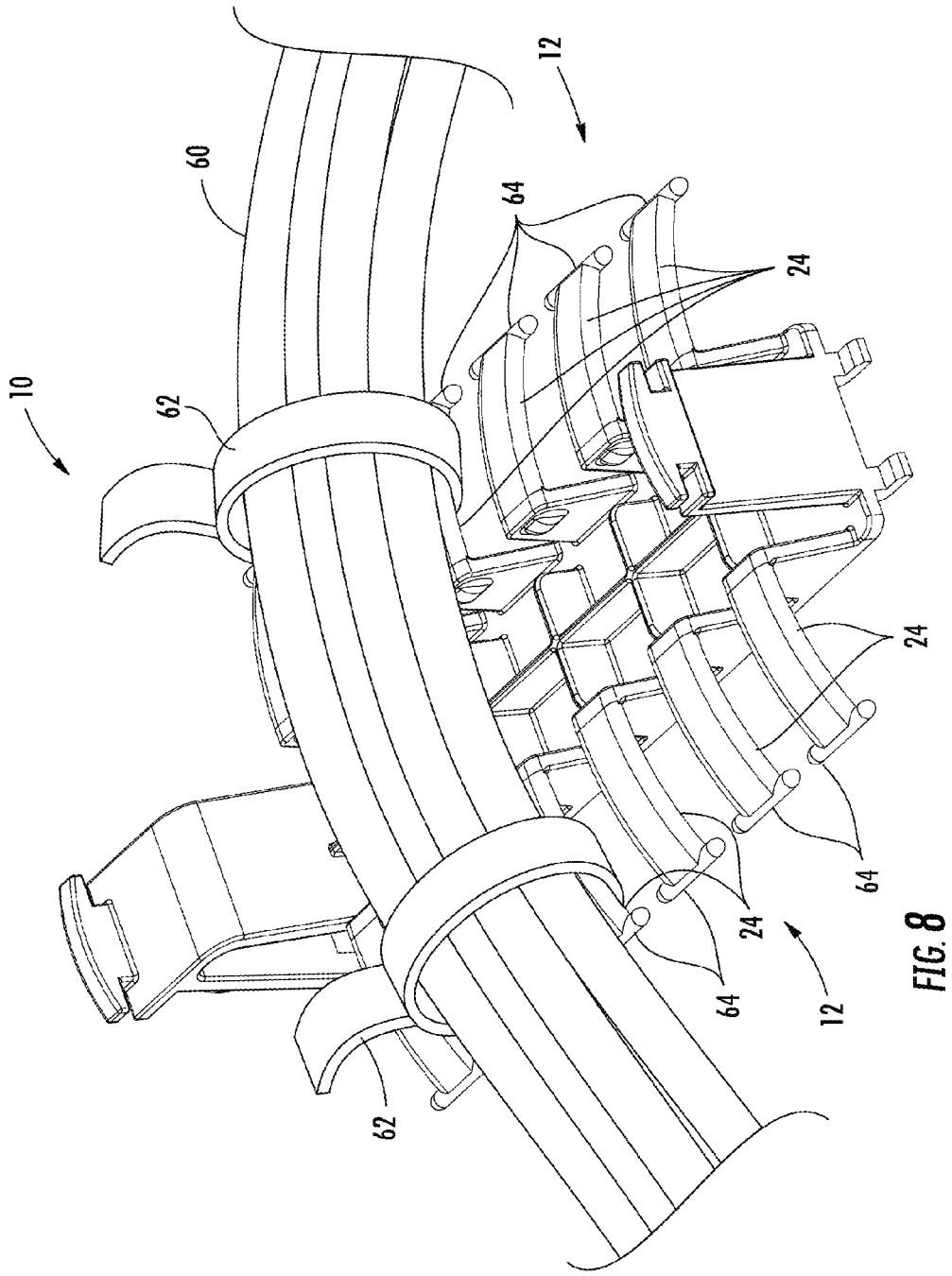


FIG. 8

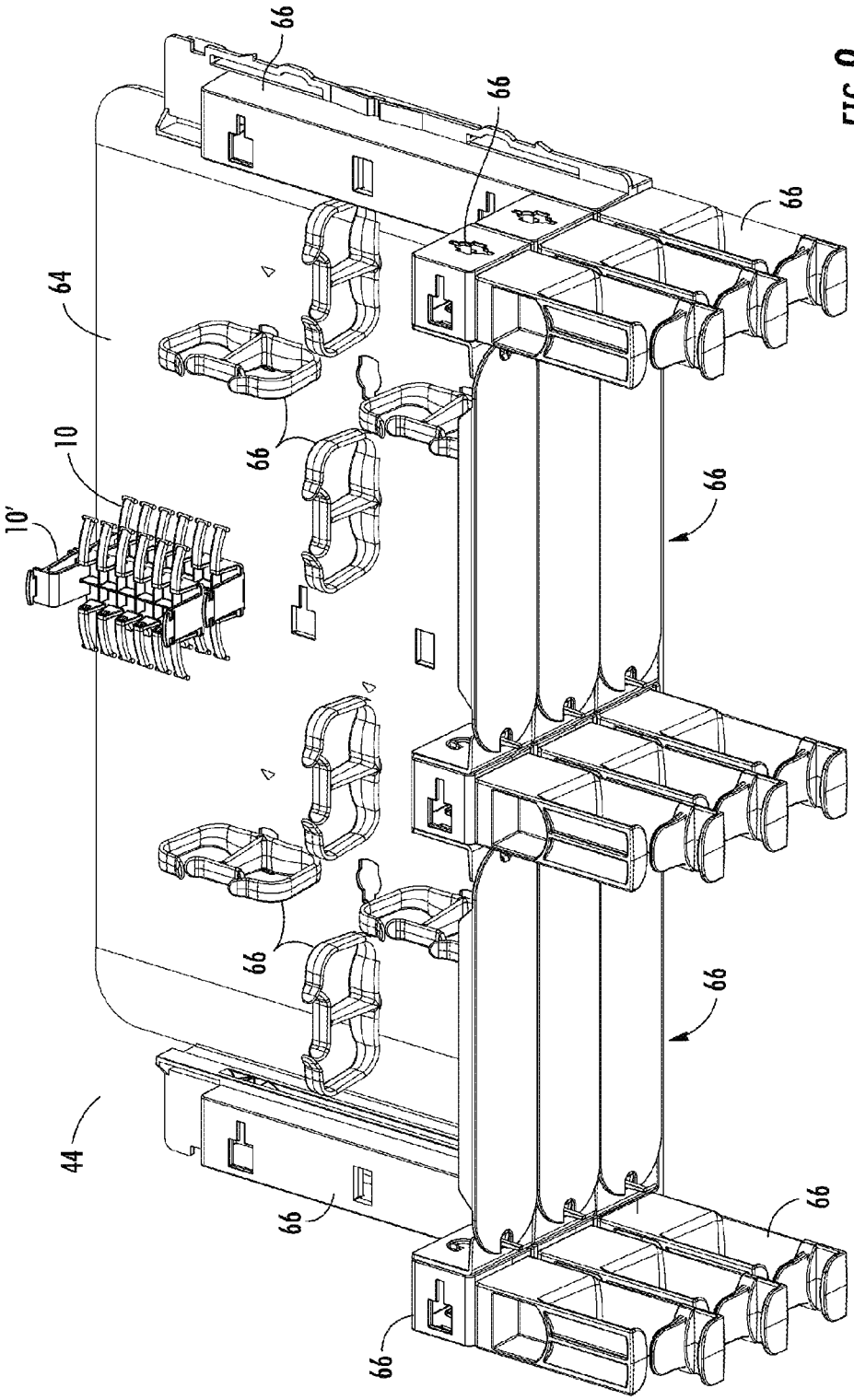


FIG. 9

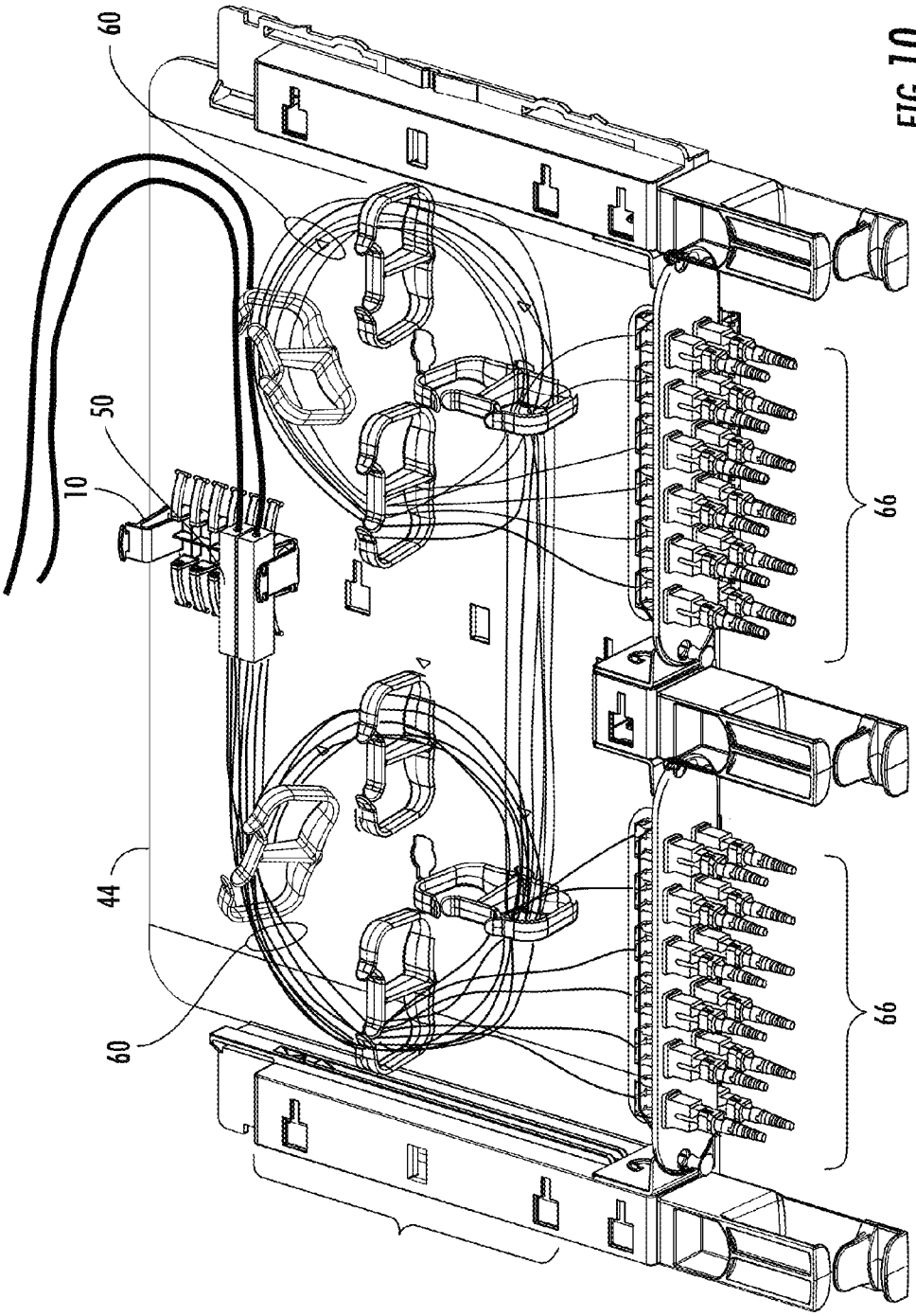
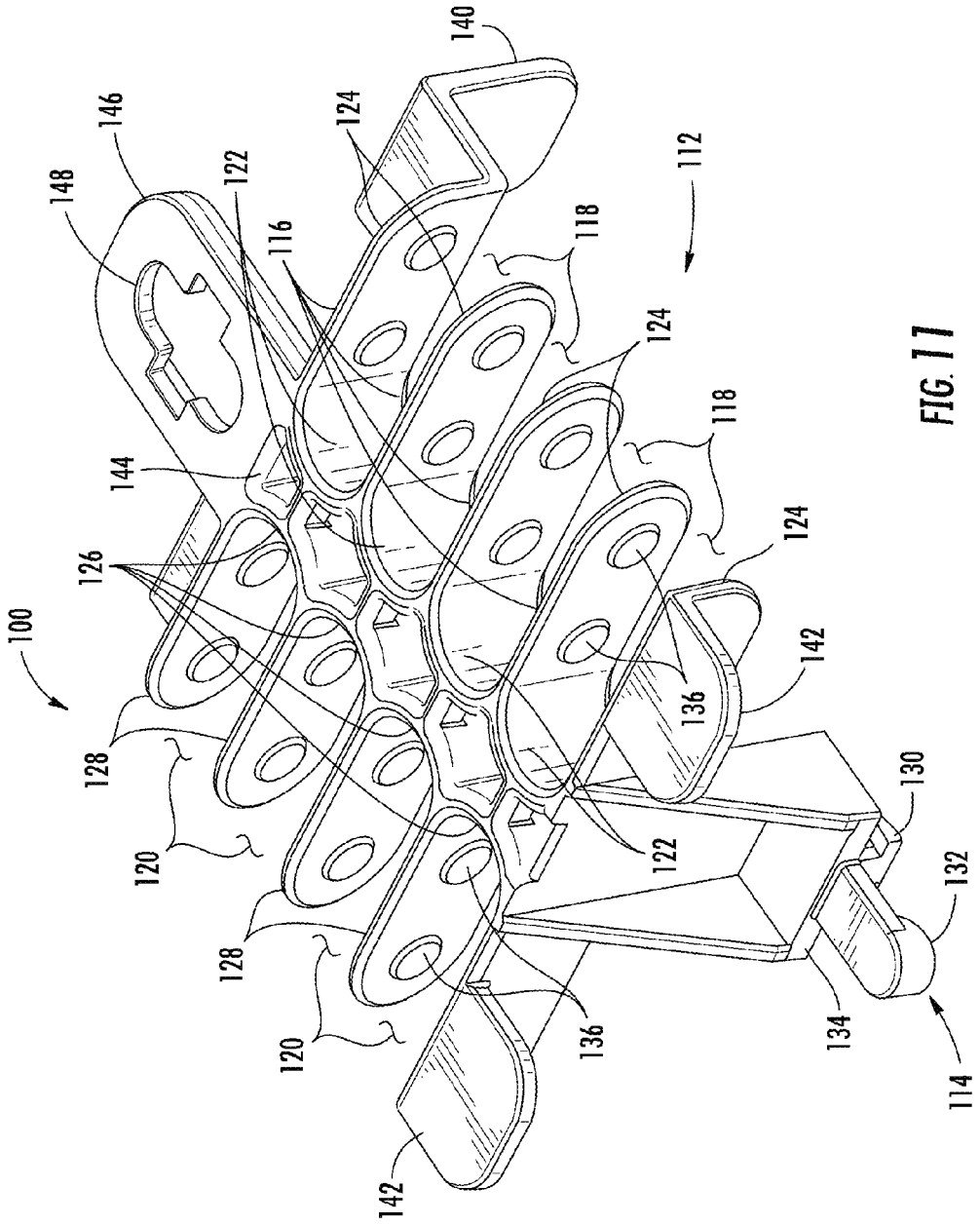


FIG. 10


100
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148

FIG. 11

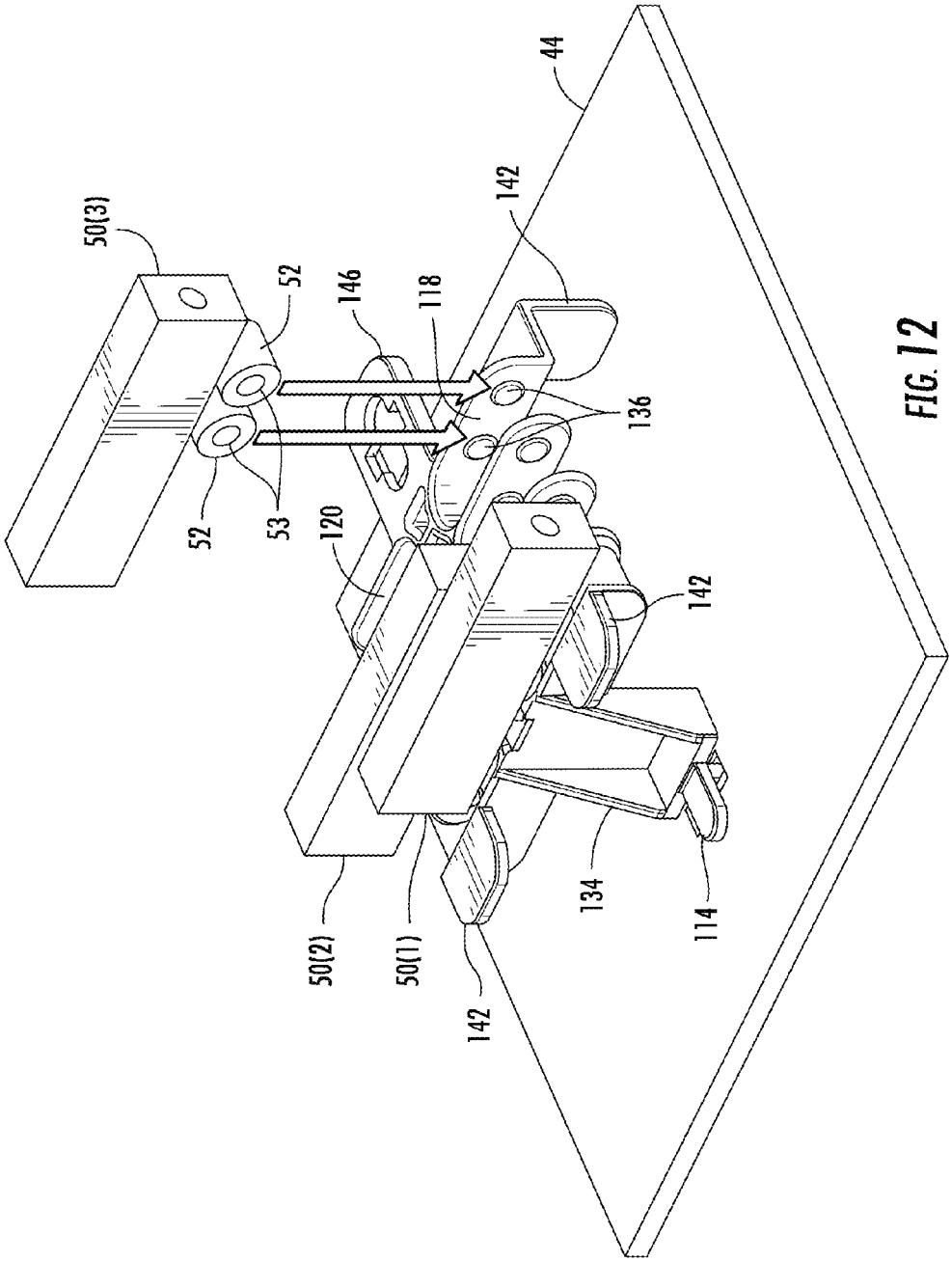

FIG. 12

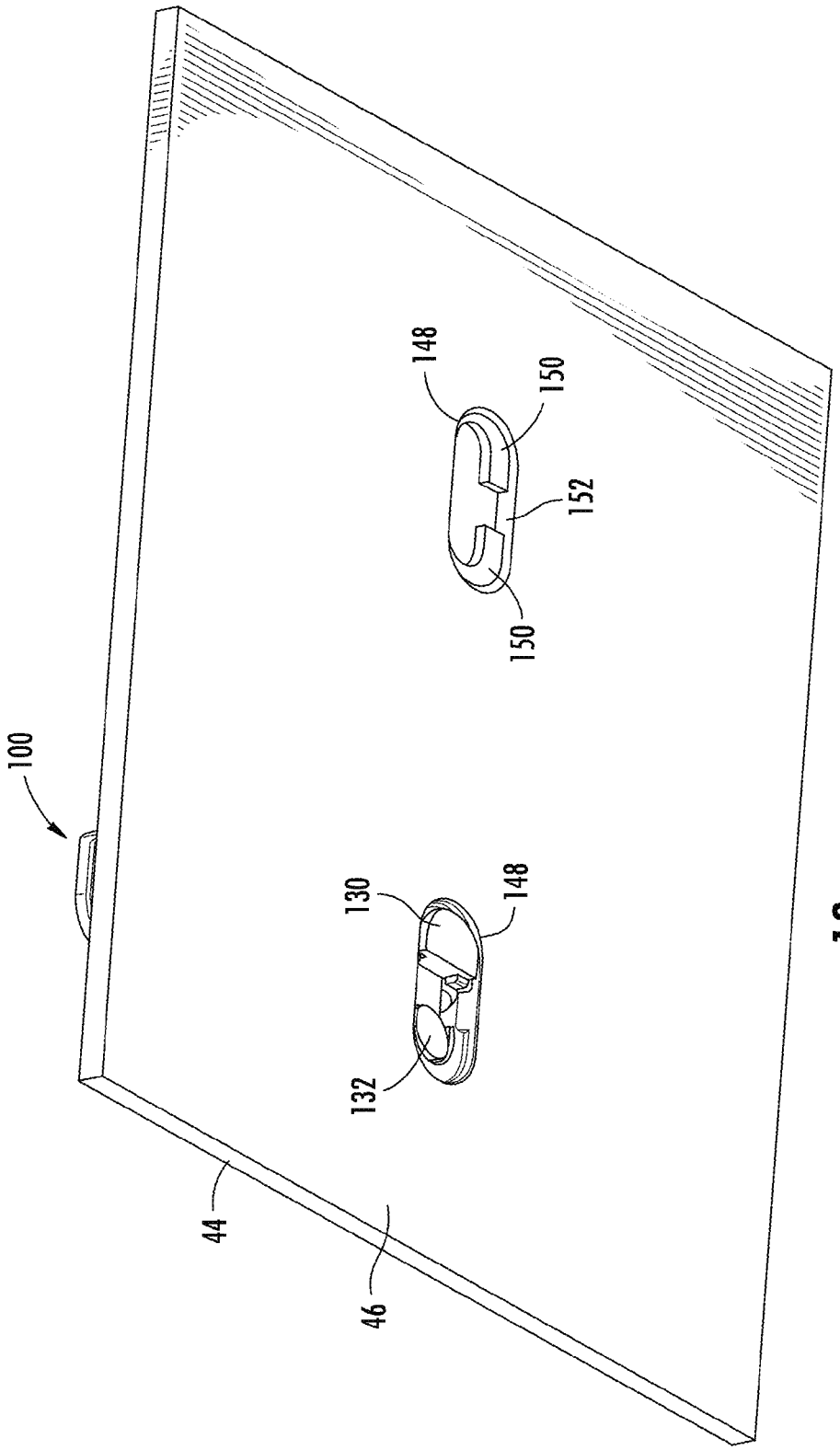

FIG. 13

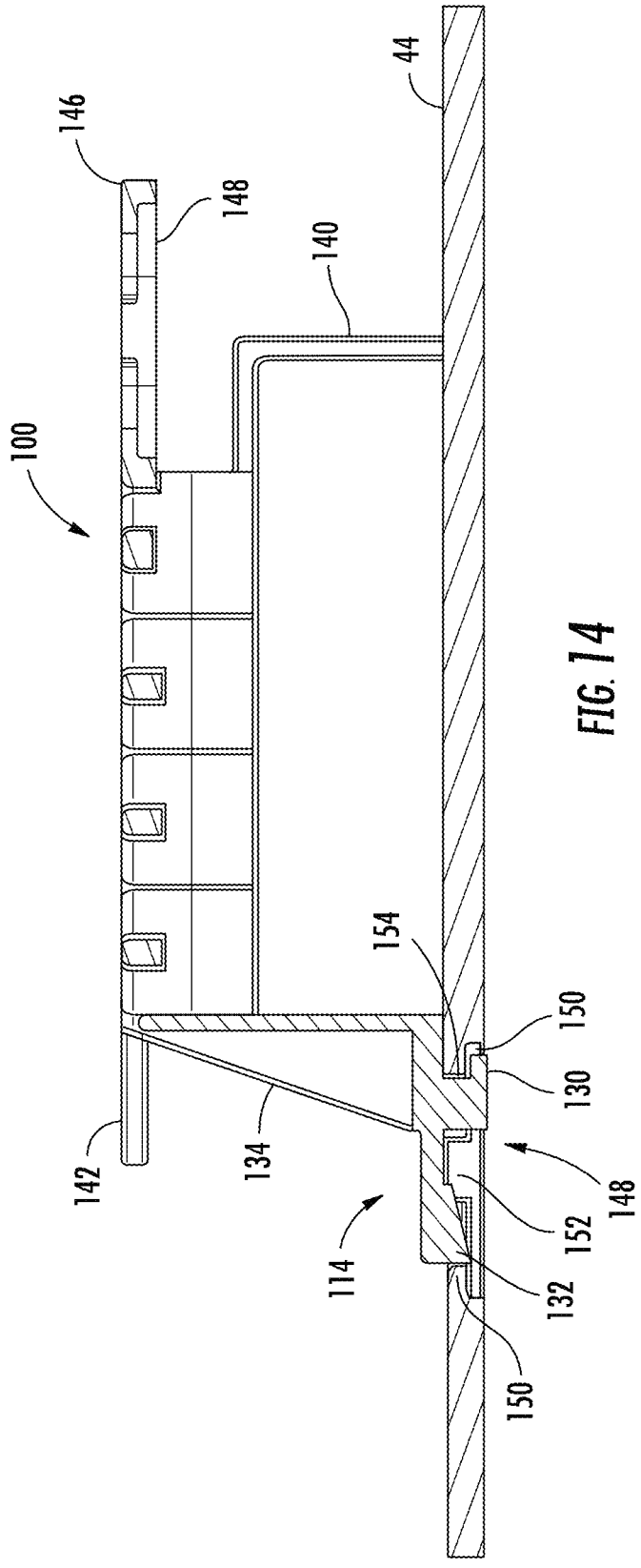

FIG. 14

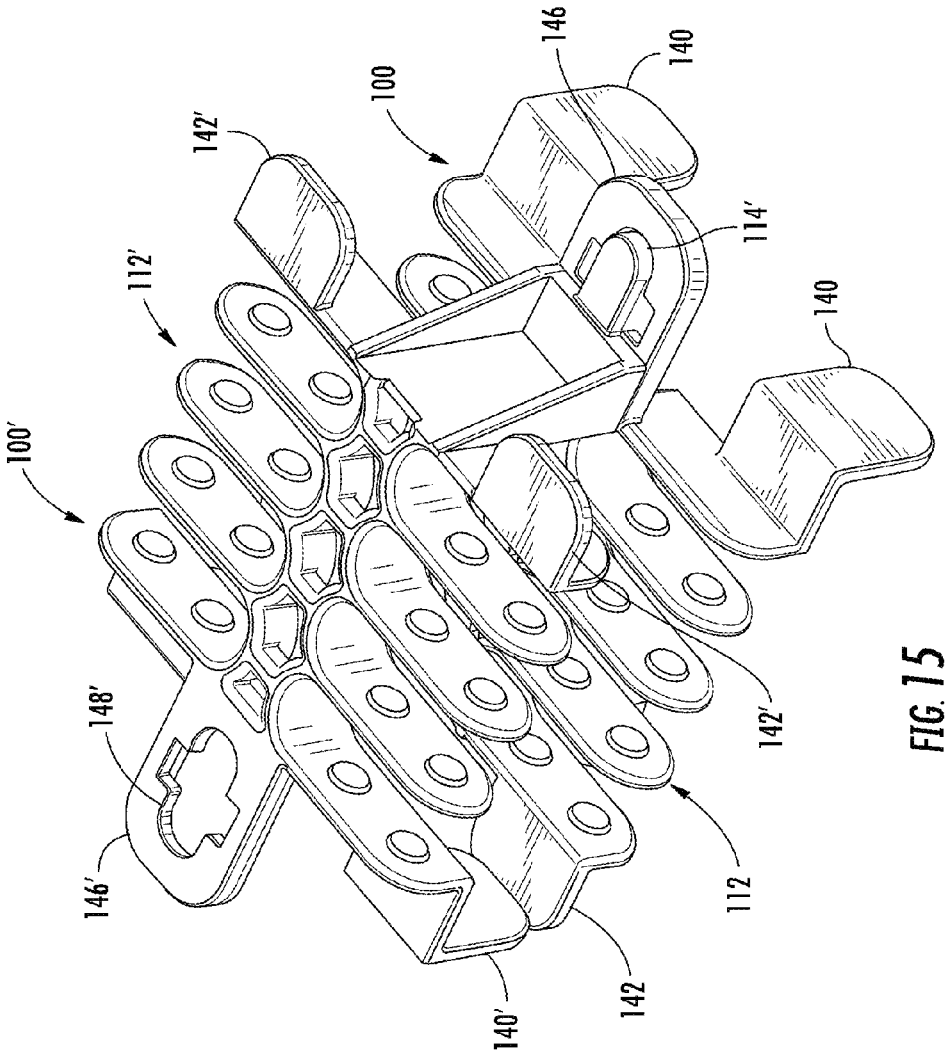

FIG. 15

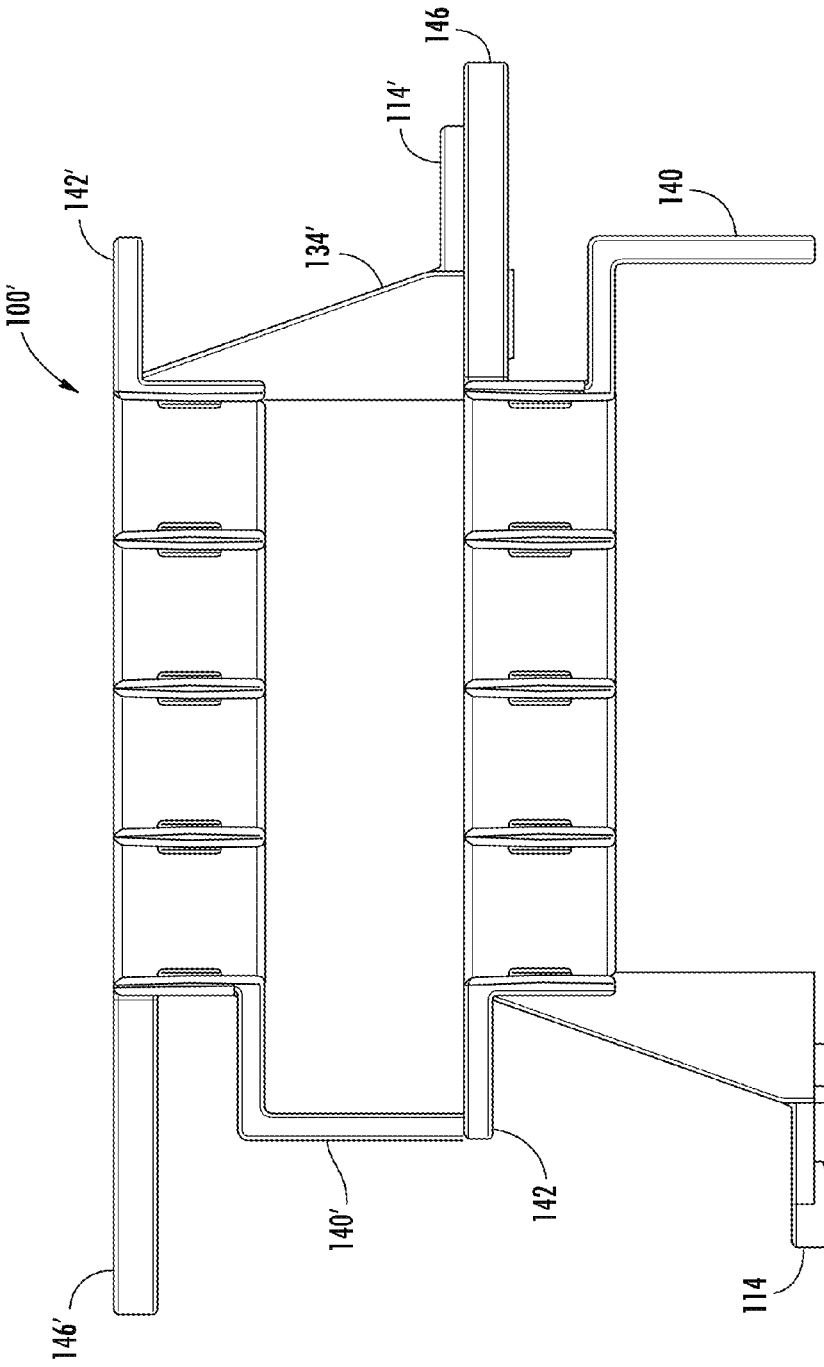

FIG. 16

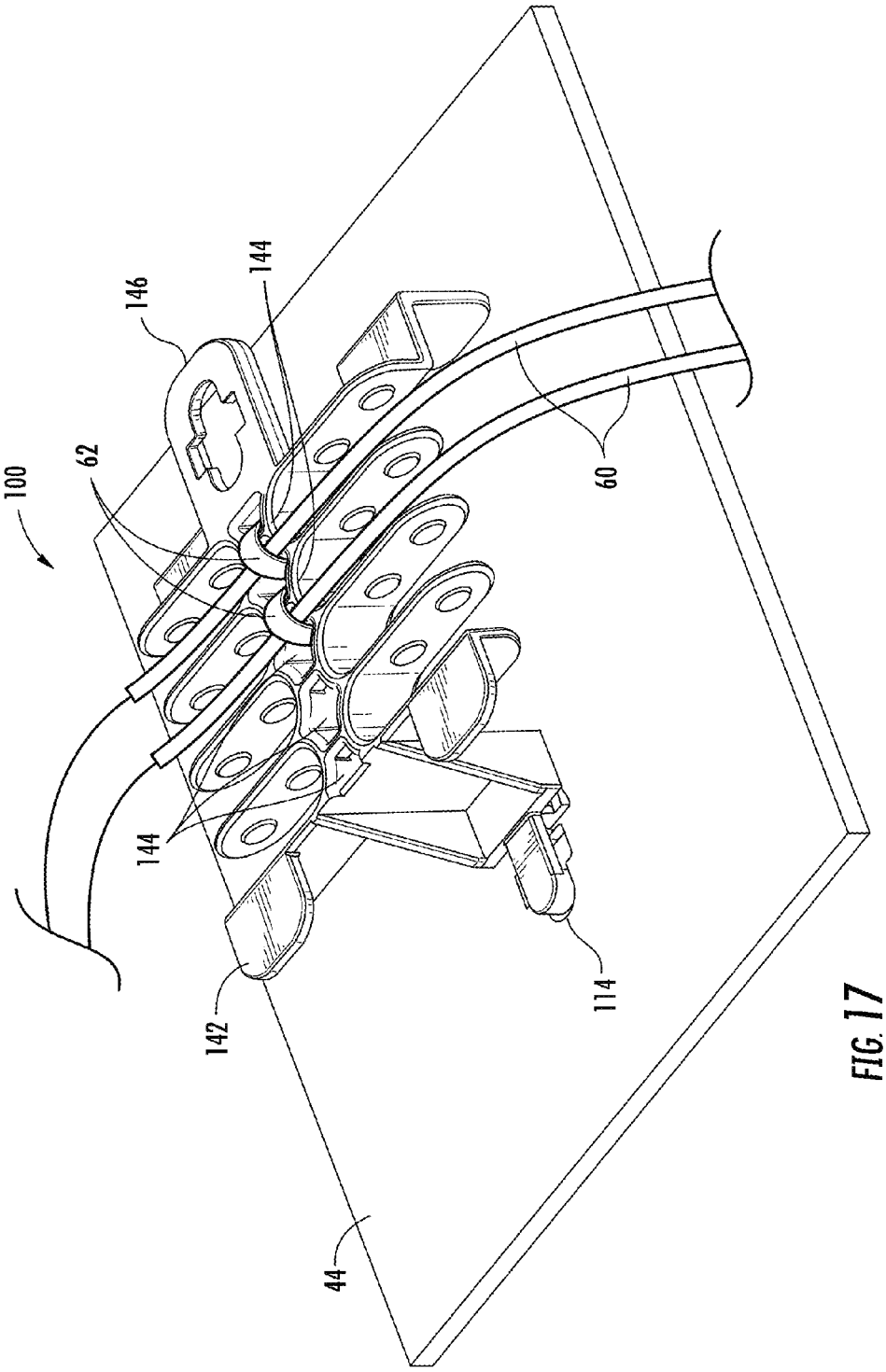

FIG. 17

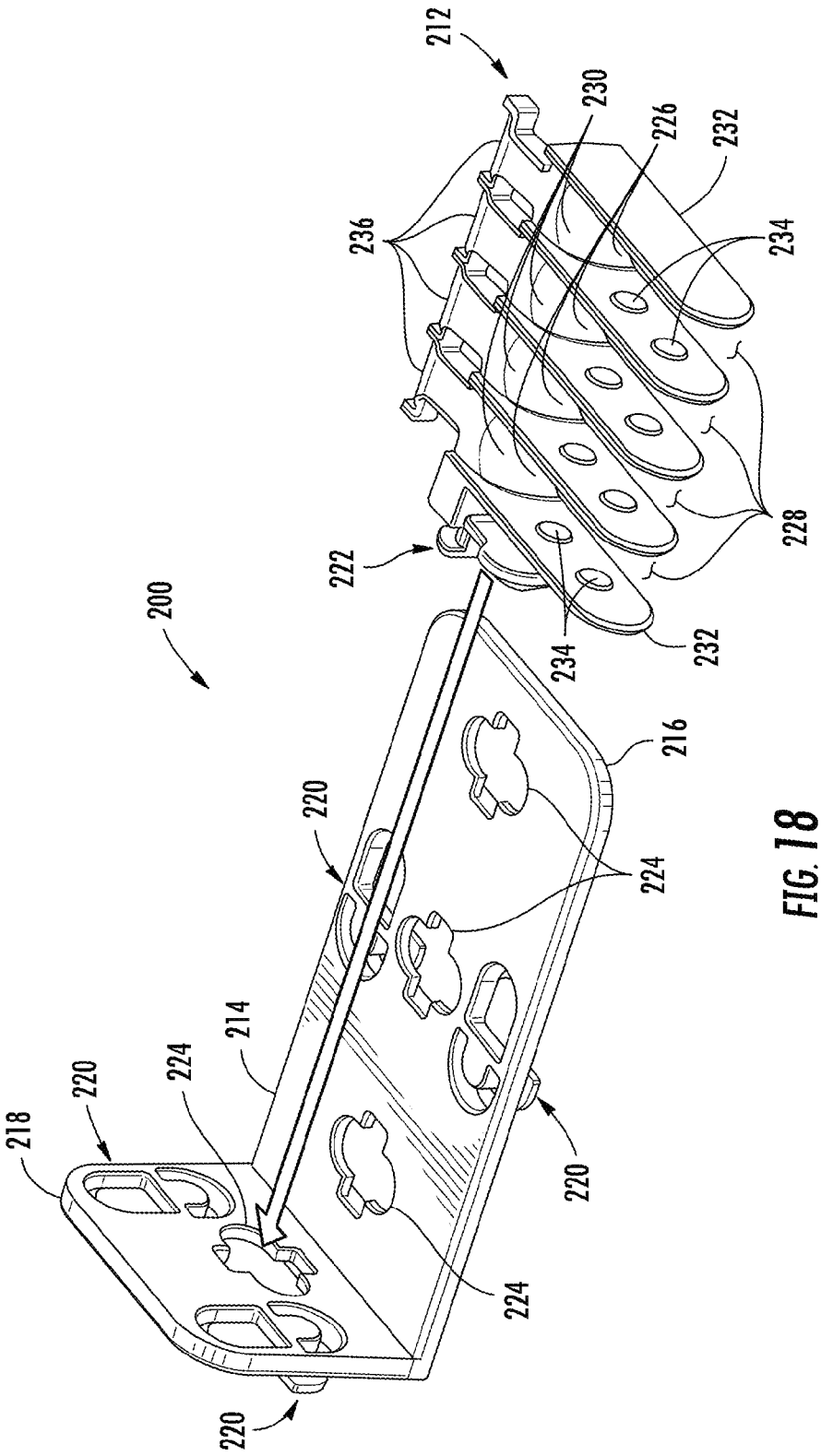
212
230
226
232
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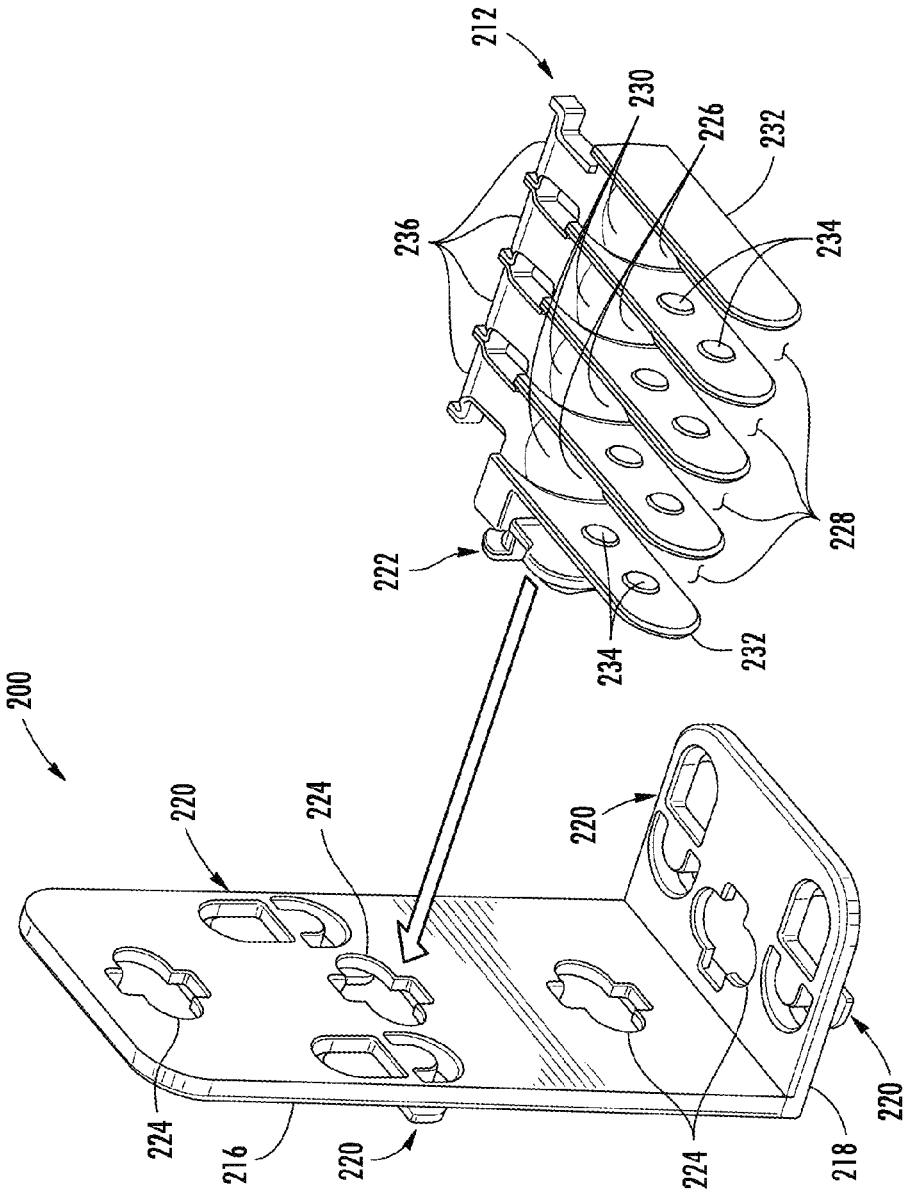
FIG. 18


212
230
226
232
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234
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232
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FIG. 19

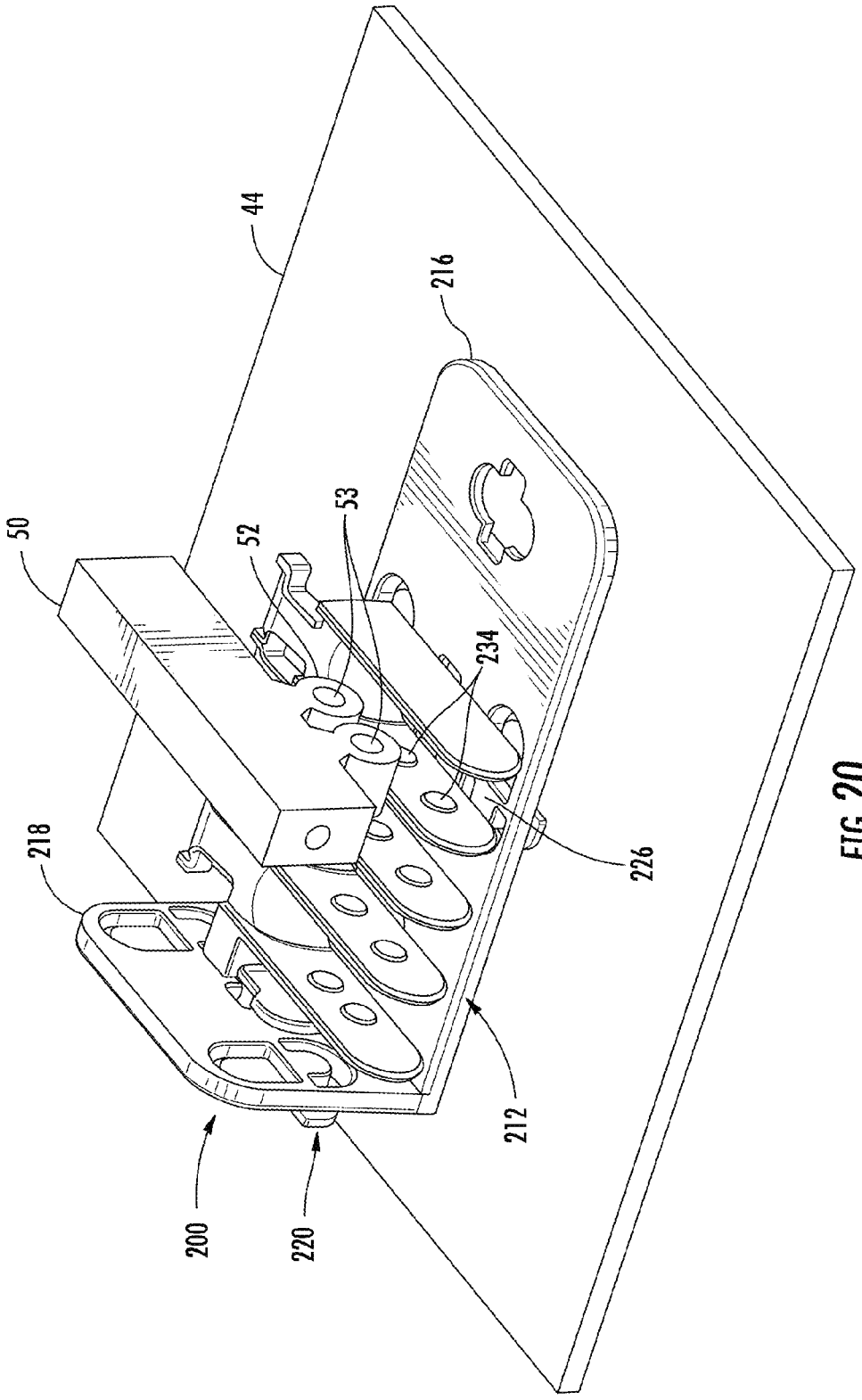

FIG. 20

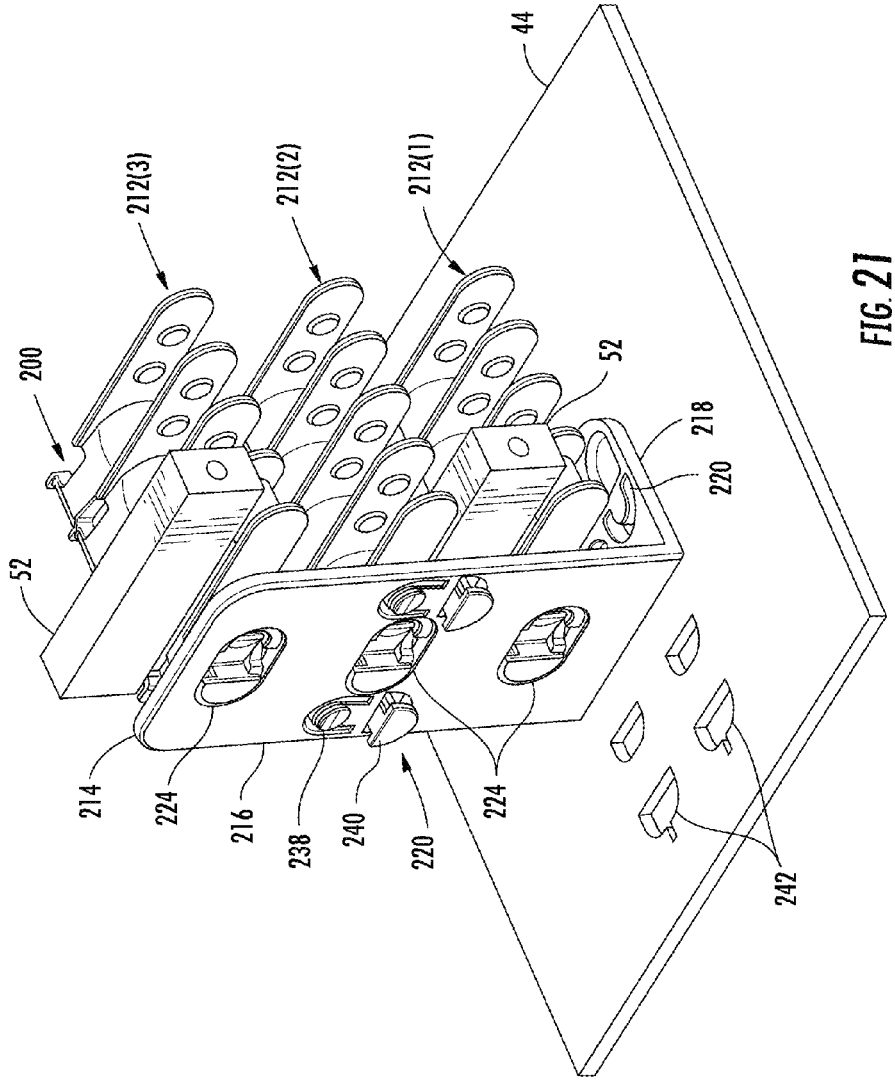
44
212(3)
212(2)
212(1)
200
52
218
220
52
214
224
216
238
240
220
224
242

FIG. 21

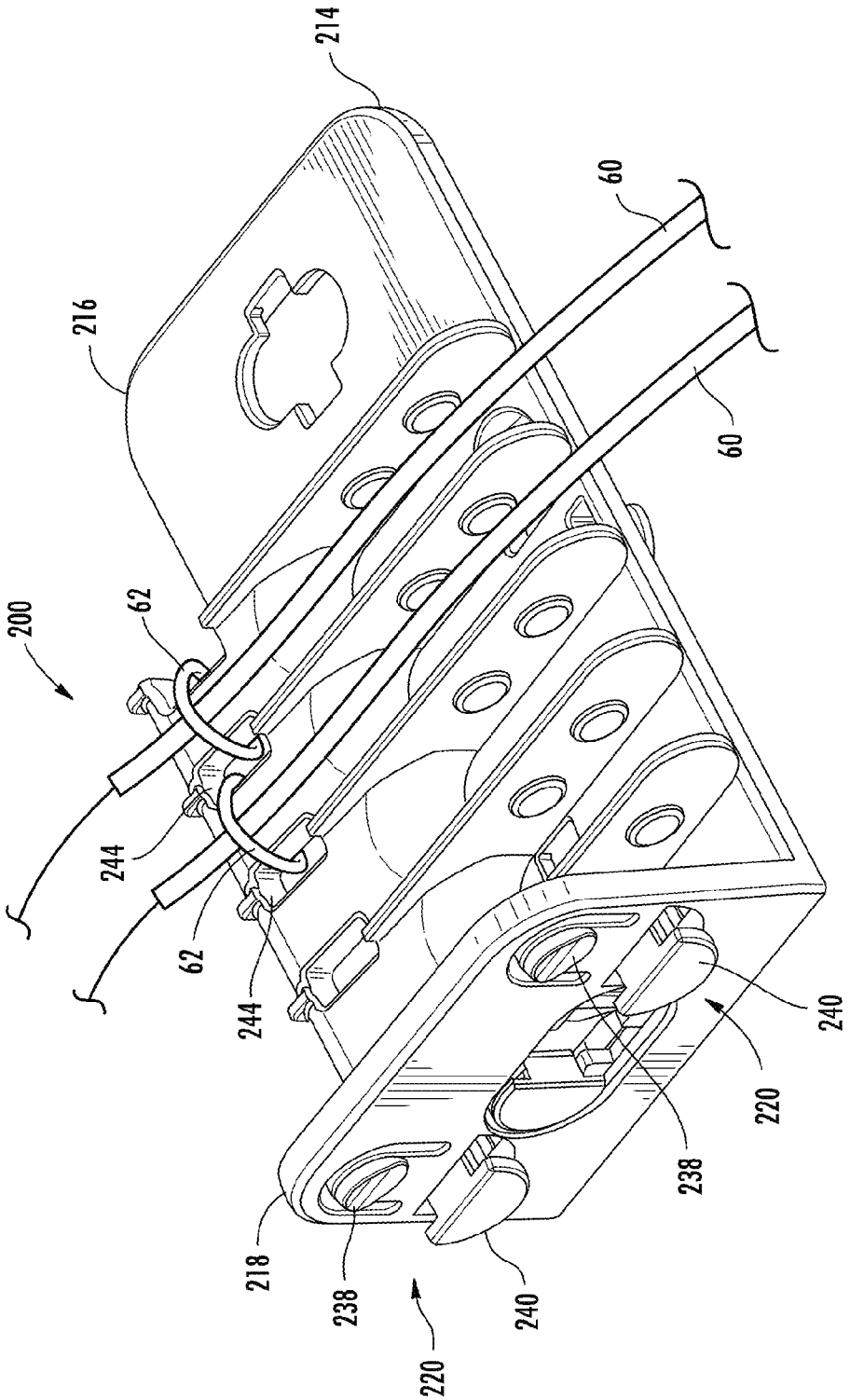

FIG. 22

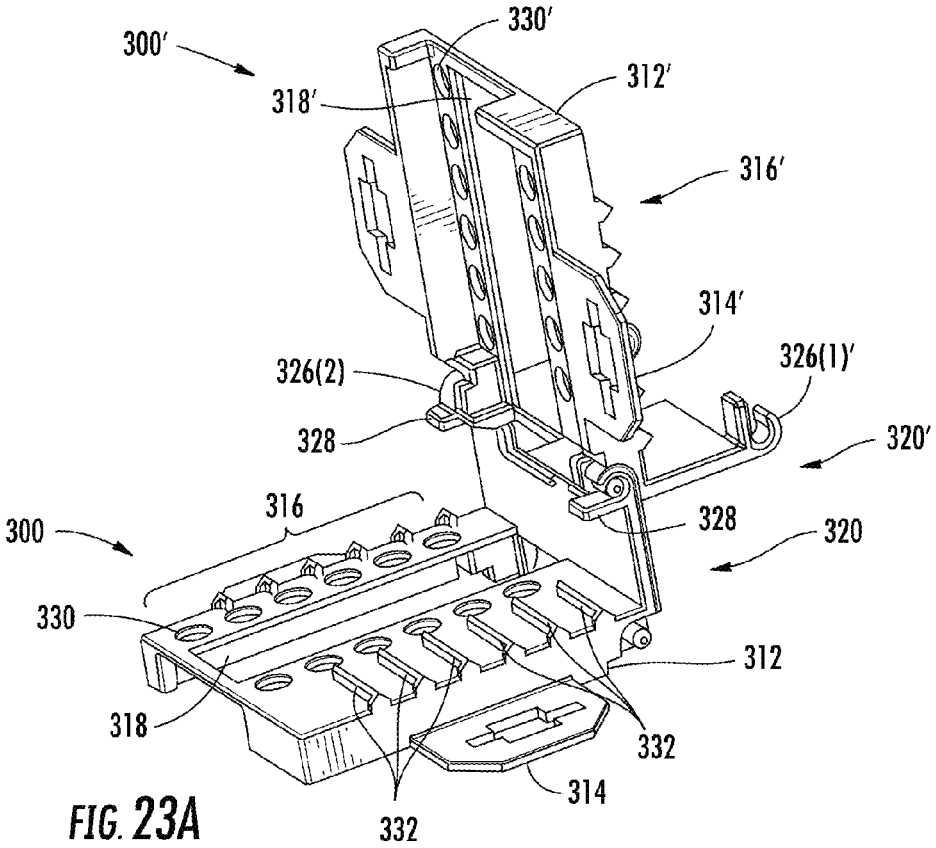

FIG. 23A

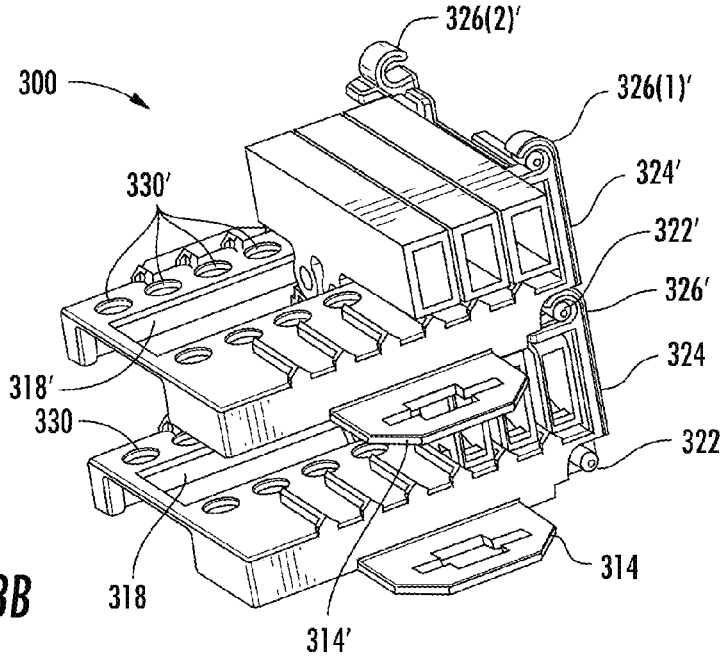

FIG. 23B

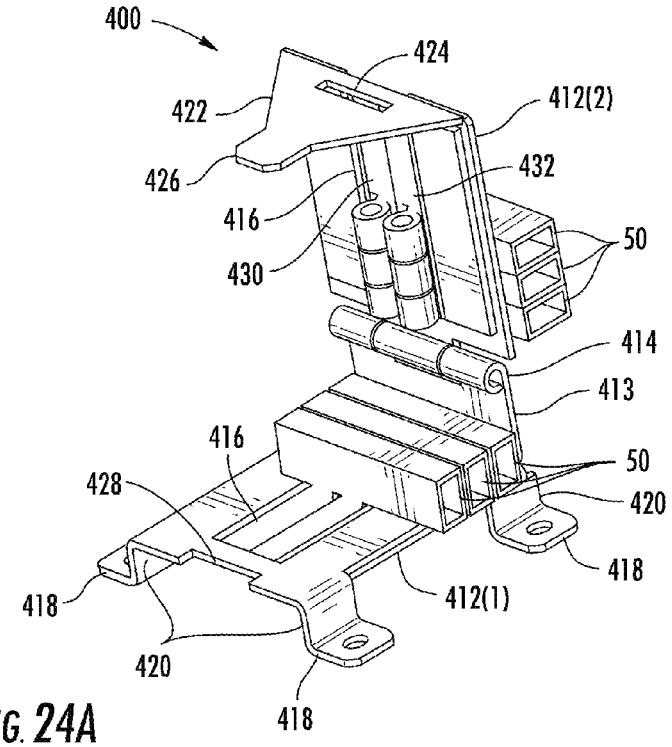

FIG. 24A

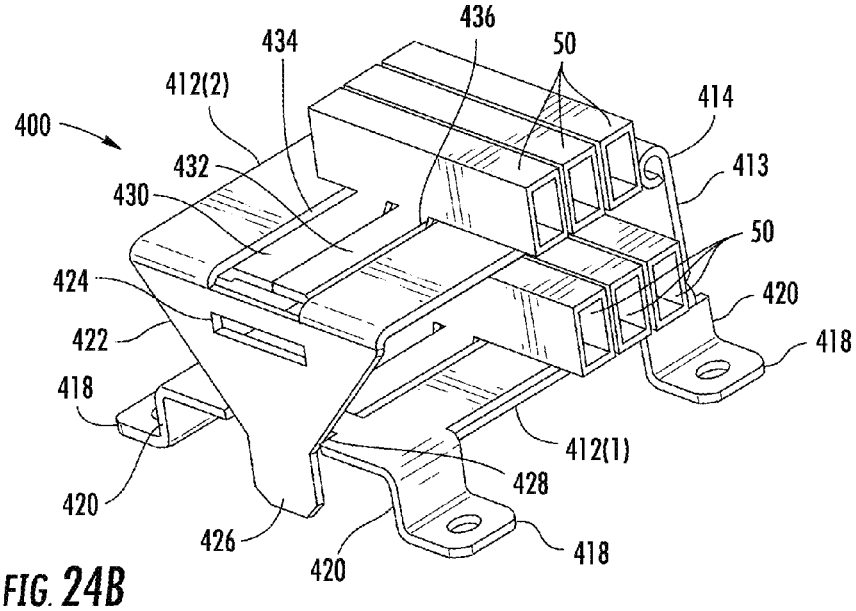

FIG. 24B

FIBER BODY HOLDER AND STRAIN RELIEF DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of International Application No. PCT/US11/62353 filed Nov. 29, 2011, which claims the benefit of priority to U.S. Application No. 61/418,106, filed Nov. 30, 2010, both applications being incorporated herein by reference.

This application is related to co-pending U.S. patent application Ser. No. 12/940,585, filed Nov. 5, 2010, the disclosure of which is relied upon and incorporated herein by reference in its entirety.

This application is related to co-pending U.S. patent application Ser. No. 12/940,699, filed Nov. 5, 2010, the disclosure of which is relied upon and incorporated herein by reference in its entirety.

BACKGROUND

1. Field of the Disclosure

The disclosure relates to an optical fiber body holder, and more particularly to a fiber body holder that is toollessly, removably attachable to fiber optic equipment, is stackable with other fiber body holders, and provides strain relief for optical fibers. The fiber body holder removably attaches to the fiber optic equipment via an attachment feature, and includes a retainer assembly to toollesslly, releasably retain fiber bodies. The fiber body holder may be configured such that another fiber body holder may be toollessly, removably attached to the fiber body holder in a stacked orientation, thereby, expanding the capacity for the fiber optic equipment to releasably retain fiber bodies.

2. Technical Background

Benefits of optical fiber include extremely wide bandwidth and low noise operation. Because of these advantages, optical fiber is increasingly being used for a variety of applications, including but not limited to broadband voice, video, and data transmission. Fiber optic networks employing optical fiber are being developed and used to deliver voice, video, and data transmissions to subscribers over both private and public networks. These fiber optic networks often include separated connection points linking optical fibers to provide "live fiber" from one connection point to another connection point.

One of the concerns in working with or installing optical fiber is the delicate nature of certain of the smaller diameter optical fiber, for example 250 μm fiber. This diameter of fiber is typically encountered in outside plant and other loose tube applications. Often this size fiber is spliced to another like fiber which can entail large loops of slack of this small diameter fiber. To help with this, installers often use a "fan-out body" which is a component in which, as an example, a 250 μm fiber may be inserted into a 900 μm fiber sleeve, thereby increasing the diameter of the workable fiber. Other types of fan-out bodies are available, including without limitation, one that may be used to convert 900 μm fibers to a ribbon cable. Additionally, other types of fiber bodies, for example, furcation bodies, may be used. Furcation bodies furcate, or separate, individual optical fibers from a fiber optic cable.

SUMMARY

Embodiments disclosed in the detailed description include a fiber optic apparatus for holding fiber bodies. The fiber optic apparatus includes a retainer assembly having at least one retainer configured to toollessly, releasably retain a fiber body, and an attachment feature configured to toollessly, removably attach the retainer assembly. The at least one retainer is configured to releasably retain the fiber body via mounting bosses on the fiber body. The at least one retainer may have a channel configured to receive at least one of the mounting bosses of the fiber body. The channel may have opposing sides. Each side of the opposing sides may have at least one retaining dimple adapted to releasably retain the mounting boss in the channel. The retaining dimple may insert into a passage formed in the mounting boss, or may position adjacent to the mounting boss to restrict the mounting boss from releasing from the channel. The mounting bosses may friction fit between the opposing sides. At least one rubber insert may be configured to receive and releasably retain the mounting bosses. The at least one rubber insert may attach to at least one of the sides and extend between the opposing sides. The at least one rubber insert may be a first rubber insert and a second rubber insert. The first rubber insert may attach to and extend from one side, and the second rubber insert may attach to and extend from the other side. The first rubber insert and the second rubber insert may be configured to releasably retain the mounting boss between the first rubber insert and the second rubber insert.

A stacking feature may be configured to removably attach a second retainer assembly to the retainer assembly via an attachment feature configured to removably attach the second retainer assembly. The stacking feature and the attachment feature configured to removably attach the second retainer assembly may form a hinge. A stand-off may be configured to raise the at least one retainer above a mounting surface when the retainer assembly is removably attached to the mounting surface. A support may be configured to support a stand-off of a second retainer assembly when the second retainer assembly is removably attached to the retainer assembly. The retainer assembly and the second retainer assembly may be similarly constructed. The retainer assembly and the second retainer assembly may be interchangeable.

The fiber optic apparatus may include a bracket with the attachment feature connected to the bracket. The bracket has a first side and a second side. The first side and the second side are connected to form an L shape. The bracket is toollesslly, removably attachable to a mounting surface in a first orientation by the first side, and toollessly, removably attachable to the mounting surface in the second orientation by the second side. The retainer assembly may be toollessly, removably attachable to the bracket, and, thereby, to the mounting surface by the attachment feature at the first side. The retainer assembly may be toollessly, removably attachable to the bracket, and, thereby, to the mounting surface by an attachment feature at the second side.

At least one fastener may be included and adapted to receive at least one of a tie wrap and a Velcro strap. The at least one fastener may be an arm. The at least one fastener may be an aperture. The at least one retainer may be configured to releasably retain one or more optical fibers to strain relief the one of more optical fibers.

Embodiments disclosed in the detailed description include a first retainer assembly having at least one retainer configured to toollessly, releasably retain a fiber body, and a second retainer assembly having at least one retainer configured to toollessly, releasably retain a fiber body. The fiber optic assembly may include a first attachment feature configured to toollessly, removably attaching the first retainer assembly, and a second attachment feature configured to toollessly, removably attaching the second retainer assembly. A first stacking feature may be configured to toollessly, removably

attach the second retainer assembly to the first retainer assembly via the second attachment feature. The first attachment feature may removably attach the first retainer assembly to a mounting surface. The mounting surface may be fiber optic equipment. The fiber optic equipment may be a shelf mounted to a chassis in a fiber optic equipment rack.

Additional features and advantages will be set forth in the detailed description which follows, and in part will be readily apparent to those skilled in the art from that description or recognized by practicing the embodiments as described herein, including the detailed description which follows, the claims, as well as the appended drawings.

It is to be understood that both the foregoing general description and the following detailed description are merely exemplary, and are intended to provide an overview or framework to understanding the nature and character of the claims. The accompanying drawings are included to provide a further understanding, and are incorporated in and constitute a part of this specification. The drawings illustrate one or more embodiment(s), and together with the description serve to explain principles and operation of the various embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a top perspective view of an exemplary embodiment of a retainer assembly and an attachment feature;

FIG. **2** is a reverse top, perspective view of the retainer assembly and the attachment feature of FIG. **1**;

FIG. **3** is an underside perspective view of a mounting surface illustrating the attachment feature of FIG. **1** removably attaching the retainer assembly to the mounting surface;

FIG. **4** is a top perspective, partially exploded view of the retainer assembly and the attachment feature of FIG. **1** with a fiber body;

FIG. **5** is a side elevation, section cut view of a fiber body retained by a retainer of the retainer assembly and the attachment feature of FIG. **1**;

FIG. **6** is a top, perspective view of a second retainer assembly and an attachment feature stacked on top of the retainer assembly and the attachment feature of FIG. **1**;

FIG. **7** is a side elevation view of a second retainer assembly and an attachment feature stacked on top of the retainer assembly and an attachment feature of FIG. **5**;

FIG. **8** is a top perspective view of the retainer assembly and the attachment feature of FIG. **1** with optical fibers strain relieved by a retainer;

FIG. **9** is a top, perspective view of the second retainer assembly and the attachment feature stacked on top of the retainer assembly and the attachment feature of FIG. **5** removably attached to a fiber optic equipment shelf with other components;

FIG. **10** is a top, perspective view of the retainer assembly and the attachment feature of FIG. **1** with a fiber body retained in the retainer assembly and with other components and optical fibers;

FIG. **11** is a top perspective view of an exemplary embodiment of a retainer assembly and an attachment feature;

FIG. **12** is a top perspective, partially exploded view of the retainer assembly and an attachment feature removably attaching the retainer assembly to a mounting surface and with fiber bodies retained in the retainer assembly and one fiber body separated therefrom; and

FIG. **13** is an underside perspective view of the mounting surface illustrating the attachment feature of FIG. **12** removably attaching the retainer assembly to the mounting surface;

FIG. **14** is a side elevation view of a section cut of the retainer assembly, the attachment feature and the mounting surface of FIG. **12**;

FIG. **15** is a reverse top, perspective view of a second retainer assembly and an attachment feature stacked on top of the retainer assembly and the attachment feature of FIG. **11**;

FIG. **16** is a side elevation view of a second retainer assembly and an attachment feature stacked on top of the retainer assembly and an attachment feature of FIG. **15**;

FIG. **17** is a top perspective view of the retainer assembly and the attachment feature of FIG. **11** with optical fibers strain relieved by a retainer;

FIG. **18** is a top, perspective exploded view of an exemplary embodiment of a retainer assembly and a bracket in a first orientation;

FIG. **19** is a top, perspective exploded view of the retainer assembly and the bracket of FIG. **18** in a second orientation;

FIG. **20** is a top, perspective, partially exploded view of the retainer assembly and the bracket of FIG. **18** in the first orientation with a fiber body separated therefrom;

FIG. **21** is a top, perspective view of the retainer assembly and the bracket of FIG. **19** in the second orientation with fiber bodies retained by retainers;

FIG. **22** is a top, perspective view of the retainer assembly and the bracket of FIG. **18** in the first orientation with optical fibers strain relieved by retainers;

FIG. **23**A is a top, perspective view of an exemplary embodiment of a retainer assembly and attachment feature, and a second retainer assembly and attachment feature stacked on top of the retainer assembly and the attachment by a hinge with the second retainer assembly and attachment feature pivoted to an open position;

FIG. **23**B is a top, perspective view of an exemplary embodiment of a retainer assembly and attachment feature and a second retainer assembly and attachment feature of FIG. **23**A with the second retainer assembly and attachment feature pivoted to a closed position;

FIG. **24**A is a top, perspective view of an exemplary embodiment of a retainer assembly and attachment feature, and a second retainer assembly and attachment feature stacked on top of the retainer assembly and the attachment by a hinge with the second retainer assembly and attachment feature pivoted to an open position; and

FIG. **24**B is a top, perspective view of an exemplary embodiment of a retainer assembly and attachment feature and a second retainer assembly and attachment feature of FIG. **24**A with the second retainer assembly and attachment feature pivoted to a closed position.

DETAILED DESCRIPTION

Reference will now be made in detail to the present preferred embodiment(s), examples of which are illustrated in the accompanying drawings. Whenever possible, the same reference numerals will be used throughout the drawings to refer to the same or like parts.

As used herein, the terms "fiber optic cables" and/or "optical fibers" include all types of single mode and multi-mode light waveguides, including one or more optical fibers that may be upcoated, colored, buffered, ribbonized and/or have other organizing or protective structure in a cable such as one or more tubes, strength members, jackets or the like. Likewise, other types of suitable optical fibers include bend-insensitive optical fibers, or any other expedient of a medium for transmitting light signals. An example of a bend-insensitive optical fiber is ClearCurve® Multimode fiber commercially available from Corning Incorporated.

The designation "U" refers to a standard equipment shelf size of a fiber optic equipment rack or a cabinet. This may also be referred to as "RU." For example, an equipment rack may support 42 1U-sized shelves, with "U" equal to a standard 1.75 inches in height and nineteen (19) inches in width. In certain applications, the width of "U" may be twenty-three (23) inches. Typically, the more rack space (the more "U's") a housing takes up, the higher the fiber capacity in the housing. It is often desirable from either a manufacturing standpoint or an installation standpoint to have the ability to conveniently convert from a 1U housing to a 2U housing.

Further, as used herein, the term "fiber body" shall be understood to mean and describe a fan-out body, a furcation body or device, strain relief device, and the like, including, without limitation, components that furcated, separate, ensleeve, or in any manner combine or un-combine optical fibers with respect to other optical fibers, fiber optic cables, coverings or jackets, and/or clamp or retain one or more optical fibers or fiber optic cables.

FIGS. **1-24**B illustrate exemplary embodiments of a fiber optic apparatus for use as a holder for fiber bodies. For purposes of describing the embodiments, the term "fiber body" shall be used herein and should be understood to mean and include, without limitation, furcation bodies, fan-out bodies, and the like. A fiber body holder may be toollessly and removably attached to a mounting surface, for example, fiber optic equipment, including 1U to 4U sized shelves and stackable shelves, and may be configured to hold and support one or more fiber bodies. The fiber body holder comprises a retainer assembly with a plurality of retainers each of which may be configured to releasably retain a fiber body. In this way, a technician may toollessly install a fiber body into and release a fiber body from the retainer without affecting other fiber bodies. Additionally, the fiber body holder comprises an attachment feature for removably attaching the retainer assembly to the mounting surface. The technician can remove from the fiber body holder from the mounting surface to install or release the fiber body from the retainer, or to relocate the fiber body holder on the mounting surface. Further, another fiber body holder may be toollessly removably attached to the fiber body holder, which may be in a stacked orientation.

In this regard, FIGS. **1-10** illustrate an exemplary embodiment of a fiber optic apparatus for use as a fiber body holder. The fiber body holder has a retainer assembly with at least one retainer formed as a channel disposed between extension members. The channel is configured to releasably retain a fiber body disposed therein via mounting bosses on the fiber body. An attachment feature connected to brackets comprising end sections provide for the ability of a technician toollessly to grip the fiber body holder and to attach the fiber body holder to and remove the fiber body holder from the mounting surface. If additional capacity is needed or desired to support additional fiber bodies, a stacking feature may be configured to removably attach a second retainer assembly by removably attaching a second fiber body holder on top of the fiber body holder.

FIG. **1** illustrates a top, perspective view of the embodiment of the fiber body holder **10**. The fiber body holder **10** has a retainer assembly **12** and an attachment feature **14**. In the embodiment shown in FIG. **1**, the retainer assembly **12** has a plurality of retainers **16**. Each retainer **16** has a channel **18** formed by end walls **20** and side walls **22**. Spaces **23** between the side walls **22** allow the side walls **22** to flex which will be described in more detail below. Extension members **24** extending from the side walls **22**. The end walls **24** are divided into first and second segments **26**, **28** by a center wall **30** which intersects the end walls **24**. The attachment feature **14** has tabs **32**, **33** and is connected to bracket **34** comprising first and second end sections **36**, **38**, and latch **40**. Latch **40** is resilient allowing a technician can grip the bracket **34** by the first end section **36** and the latch **40**, squeeze the fiber body holder **10** between the first end section **36** and the latch **40** so that the tabs **32**, **33** can be inserted into receivers disposed in a mounting surface (not shown) to toollessly, removably attach the fiber body holder **10**, and, thereby, the retainer assembly **12**, to the mounting surface. This will be described in more detail with reference to FIGS. **2** and **3**, below.

FIG. **2** illustrates a top, perspective view of the fiber body **10** from the perspective of second end section **38**, which is a reverse perspective from that of FIG. **1**. FIG. **2** is provided to illustrate release button **42** on latch **40**. The release button **42** is provided for the technician to push as the technician is squeezing the fiber body holder **10** between the first end section **36** and the latch **40** as described above. This pivots the latch **40** and moves the tabs **33** on the latch **40** toward the second end section **38**. The tabs **32** on the first end section **36** may be inserted in and retained by their respective receivers in the mounting surface first, with the tabs **33** on the latch **40** inserted in their respective receivers second. Due to its resiliency, the latch **40** will pivot back to its initial position when the technician releases the release button **42**. This also causes the tabs **33** on the latch **40** to move back to their initial position, and thereby, being retained by their respective receivers. The fiber body holder **10**, and, thereby, the retainer assembly **12**, can be toollessly removed from the mounting surface by the technician pushing the release button **42** and removing the tabs **33** on the latch **40** from the mounting surface, and then removing the tabs **32** on the first end section **36** from the mounting surface.

FIG. **3** is a bottom perspective view of the mounting surface **44** illustrating the underside **46** of the mounting surface **44**. In FIG. **3**, tabs **32** on the first end section **36** and tabs **33** on the latch **40** are shown inserted in and being retained by a receivers **48**. The receivers **48** may have a lip **49**. The tabs **32**, **33** may be inserted in the receiver **48** and moved so that the tabs **32**, **33** friction fit against the lip **49**. The tabs **32** and the tabs **33** are similarly designed such that they may be inserted and retained either of the receivers **48** shown in FIG. **3**. In this way, the fiber body holder **10** can be oriented and located in different positions on mounting surface **44**. Alternatively, the tabs **32** and the tabs **33** may be designed differently such that the fiber body holder **10** may be removably mounted to the mounting surface **44** in a certain orientation.

FIG. **4** is a top, perspective view of the fiber body holder **10** with a fiber body **50** shown separate from the fiber body holder **10**. The fiber body **50** would insert in the channel **18** of one of the retainers **16** of the retainer assembly **12**. In FIG. **4**, the fiber body **50** is shown as being inserted into the channel **18** closest to the second end section **38**. The fiber body **50** may be inserted into the channel **18** in either of two opposite directions such that the optical fibers may fan out in either direction. Fiber bodies **50** may be inserted into the retainer assembly **12** starting with the channel **18** closest to the second end section **38** and, then, inserted into channels **18** sequentially progressing from the second end section **38** toward the first end section **36**. When fiber bodies **50** are inserted in all of the retainers **16** of a fiber body holder **10**, the fiber body holder may be considered full or fully loaded and additional fiber bodies would be inserted in retainers **16** of another fiber body holder **10**. The fiber body **50** has two mounting bosses **52**. One mounting boss **52** inserts into the first segment **26** of the channel **18** and the other mounting boss **52** inserts into the second segment **28** of the channel **18**.

FIG. **5** shows a section view of a fiber body **50** inserted in the retainer assembly **12** cut through the retainer **16**. The mounting bosses **52** are shown inserted in first segment **26** and second segment **28** of the channel **18**. As illustrated in FIG. **5**, the side wall **22** of the first segment **26** has a first retaining dimple **54** and the side wall **22** of the second segment **28** has a second retaining dimple **56**. As the fiber body **50** is being inserted in the retainer **16**, the mounting bosses **52** put pressure on the retaining dimples **54**, **56** forcing side walls **22** to flex outwardly. This allows the mounting bosses **52** to be inserted in the first segment **26** and the second segment **28**. Once the mounting bosses **52** are inserted, the side walls **22** return to their initial positions causing the retaining dimples **54**, **56** align adjacent to the mounting bosses **52** in such a way to retain the mounting bosses **52** in the first segment **26** and the second segment **28** of the channel **18**. The mounting bosses **52** insert in the channel **18** with one mounting boss **52** on one side of the center wall **30** and the other mounting boss **52** on the other side of the center wall **30**. In this way, the center wall **30** prevents the fiber body **50** from rotating. When the fiber body **50** is being removed from the retainer **16**, the mounting bosses **52** again put pressure on the retaining dimples **54**, **56** forcing side walls **22** to flex outwardly allowing the mounting bosses **52** to pass by the retaining dimples **54**, **56** and be removed from the retainer **16**. In this way, the retainer **16** may releasably retain the fiber body **50**.

FIG. **6** illustrates the fiber body holder **10** with a second fiber body holder **10'** having a second retainer assembly **12'** removably attached to the fiber body holder **10** in a stacked orientation. The fiber body holder **10** is shown removably attached to a mounting surface **44**. As mentioned above, when all of the retainers **16** of a fiber body holder **10** are releasably retaining fiber bodies **50**, additional fiber body holders **10** may be provided for additional fiber bodies **50**. One way to do this, as shown in FIG. **6**, is for multiple fiber body holders **10** to be stacked on top of each other. For facilitate clarity in discussing FIG. **6**, and to distinguish the fiber body holders, the fiber body holder attached to the mounting surface **44** will be referred to as the first fiber body holder **10**. The fiber body holder removably attached to the first fiber body holder **10** will be referred to as the second fiber body holder **10'**. In FIG. **6**, the first fiber body holder **10** and the second fiber body holder **10'** are shown as being of a similar design and construction. Thus, the description of the first fiber body holder **10** as set out herein, may also apply to the second fiber body holder **10'**. However, it is not necessary that the first fiber body holder **10** and the second fiber body holder **10'** be of the same design and construction.

FIG. **7** illustrates a side elevation of the second fiber body holder **10'** removably attached to the first fiber body holder **10** in a stacked orientation. The first fiber body holder **10** has a stacking feature **56** on the first end section **36** and the second end section **38**. The stacking feature **56** is configured to receive tabs **32'** and **33'** of the attachment feature **14'** of the second fiber body holder **10'**. Therefore, the second fiber body holder **10'** may be removably attached to the first fiber body holder **10** in the same manner as the first fiber body holder **10** is removably attached to the mounting surface **44**. In this regard, a release button **42'** is provided for the technician to push as the technician is squeezing the fiber body holder **10'** between the first end section **36'** and the latch **40'**. This pivots the latch **40'** and moves the tabs **33'** on the latch **40'** toward the second end section **38'**. The tabs **32'** on the first end section **36'** may be inserted in and retained by the stacking feature **56** connected to the first end section **36** of the of the first fiber body holder **10** first, with the tabs **33'** on the latch **40'** inserted in and retained by the stacking feature **56** connected to the second end section **38** of the of the first fiber body holder **10**. Due to its resiliency, the latch **40'** will pivot back to its initial position when the technician releases the release button **42'**. This also causes the tabs **33'** on the latch **40'** to move back to their initial position, and thereby, being retained by the stacking feature **56**. The second fiber body holder **10'**, and, thereby, the second retainer assembly **12'**, can be removed from the first fiber body holder **10** by the technician pushing the release button **42'** and removing the tabs **33'** on the latch **40'** from the stacking feature **56** of first fiber body holder **10**, and then the tabs **32'** on the first end section **36'** from the stacking feature **56** of the first fiber body holder **10**. Additionally, the second fiber body holder **10'** has a stacking feature **56'** which not only allows another fiber body holder to be removably attached to the second fiber body holder **10'** in a further stacked orientation, but, also, makes the first fiber body holder **10** and the second fiber body holder **10'** interchangeable.

FIG. **8** illustrates the fiber body holder **10** used to strain relief optical fibers **60**. The extension members **24** may be used as fastening members. In this way the optical fibers **60** are attached to the extension members **24** using tie wraps **62**. The extension members **24** are terminated by tie wrap retainers **64** which retain the tie wraps on the extension members **24** and inhibit the tie wraps **62** from slipping off of the extension members **24**. Alternatively or additionally, Velcro may be used to attach the optical fibers to the extension members **24**.

FIG. **9** illustrates the mounting surface **44** as a shelf **64** of fiber optic equipment with the first fiber body holder **10** removably attached to the shelf **64** which may be a type of stackable shelf. The second fiber body holder **10'** removably attached to the first fiber body holder **10**. In FIG. **9**, the shelf **64** is shown as having other fiber optic components **66**. The other fiber optic components **66** may be any type of component, as examples, without limitation, adapters, splitters, fan-out devices, slack storage devices, strain relief devices, routing guides, and the like.

FIG. **10** illustrates the shelf **64** shown in FIG. **9** with a fiber optic body **50** being releasably retained by a fiber optic holder **10** removably attached to the shelf **64**. Optical fibers **60** route to the fiber optic holder **50** the other fiber optic components **66**. At one end, the optical fibers **60** routed to the fiber optic holder **50** may be a fiber optic cable, for example, a 900 μm fiber sleeve with multiple 250 μm optical fibers therein.

FIGS. **11-17** illustrate an exemplary embodiment of a fiber optic apparatus for use as a fiber body holder. The fiber body holder has a retainer assembly with at least one retainer having two channels. The channels are configured to releasably retain a fiber body disposed therein via mounting bosses on the fiber body. An attachment feature connected to a bracket provides for the ability of a technician to attach the fiber body holder to and remove the fiber body holder from the mounting surface. If additional capacity is needed or desired to support additional fiber bodies, a stacking feature may be configured to removably attach a second retainer assembly by removably attaching a second fiber body holder on top of the fiber body holder.

FIG. **11** illustrates a top, perspective view of the embodiment of the fiber body holder **100**. The fiber body holder **100** has a retainer assembly **112** and an attachment feature **114**. In the embodiment shown in FIG. **11**, the retainer assembly **112** has a plurality of retainers **116**. Each retainer **116** has a first channel **118** and a second channel **120**. The first channel **118** is defined by first end wall **122** and first side wall **124**. The second channel **120** is defined by second end wall **126** and second side wall **128**. The attachment feature **114** has a flange **130** and a protrusion **132** and is connected to bracket **134**. At least one retaining dimple **136** protrudes from the first side

wall **124** and the second side wall **128** into the first channel **118** and the second channel **120**, respectively. In FIG. **11**, four retaining dimples **136** protrude into each of the first channels **118** and the second channels **120** with a two of the four retaining dimples **136** opposite each other to form two opposing pairs of retaining dimples **136** for each first channel **118** and each second channel **120**. Stand-offs **140** raise the retainer assembly **112** a certain distance above a mounting surface (not shown in FIG. **11**). Supports **142** support the stand-offs of a second fiber body holder which may be removably attached to the fiber body holder **100** as will be discussed below. Apertures **144** defined by the first end walls **122** and second end walls **126** separate the first channels **118** and the second channels **120**. A stacking feature **146** having a receiver **148** allows the removable attachment of another fiber body holder to the fiber body holder **100**.

FIG. **12** illustrates the fiber body holder **100** removably attached to a mounting surface **44**. Two fiber bodies **50**(**1**), **50**(**2**) are shown releasably retained by the retainers **116**. The fiber body **50**(**1**) is shown inserted in the first channel **118** of one of the retainers **116**, and the fiber body **50**(**2**) is shown in a reverse orientation and inserted in the second channel **120** of another retainer **116**. Fiber body **50**(**3**) is shown separate from the fiber body holder **100**. The fiber body **50**(**3**) would insert in the first channel **118** of another one of the retainers **116**. Each mounting boss **52** of the fiber body **50**(**3**) aligns with an opposing pair of retaining dimples **136**. Only one retaining dimple **136** from each opposing pair of retaining dimples **136** is shown in FIG. **12**.

The first side walls **124** and the second side walls **128** are resilient. When the fiber body **50** is inserted in the first channel **118** or the second channel **120** the mounting bosses **52** put pressure on the retaining dimples **136** which forces the first side walls **124** or the second side walls **128**, as the case may be, to flex. This widens the first channel **118** and/or the second channel **120** allowing the mounting bosses **52** to be inserted in the first channel **118** and/or the second channel **120**. When the passage **53** through the mounting bosses **52** reaches the retaining dimples **136**, each of pair of opposing retaining dimples **136** positions in respective opposite ends of the passage **53**. The first side walls **124** and the second side walls **128** then flex back toward their initial positions. In this way, the retaining dimples **136** retain the mounting boss **52** in the first channel **118** and/or the second channel **120**, as the case may be, and, thereby, releasably retain the fiber body **50** in the retainer **116**. When the fiber body **50** is being removed from the retainer **116**, the mounting bosses **52** put pressure the retaining dimples **136** forcing the retaining dimples **136** out of the respective opening in the passage **53**, which forces the first side walls **126** and/or the second side walls **128** to flex outwardly allowing the mounting bosses **52** to be removed from the first and/or second channel **118**, **120**. In this way, the retainer **16** may releasably retain the fiber body **50**.

FIG. **13** illustrates a bottom perspective view of the mounting surface **44** showing the underside **46** of the mounting surface **44**. In FIG. **13** two receivers **148** are shown. One receiver **148** has an attachment feature **114** inserted therein, while the other receiver **144** does not. As shown by the receiver **144** without an attachment feature **114**, the receiver has a segmented lip **150** extending at least partially around the perimeter of the receiver **144** and indented from the underside **46** of the mounting surface **44**. A slot **152** separates the segments of the lip **150**. The attachment feature **114** inserts in the receiver **148** by first inserting the flange **130** in the slot **152** and moving the flange **130** over one of the segments of the lip **150**. The lip **150** then positions in a notch **154** formed by the flange **130**. When the flange **130** is positioned over the lip **150**, the protrusion **132** is positioned against the other segment of the lip **150** and friction fits against the lip **150**. The flange **130** and the protrusion **132** may be inserted at either segment of the lip **150** allowing the fiber body holder **100** to be removably attached to the mounting surface **44** in two orientations with respect to each receiver **148**.

FIG. **14** illustrates is a side elevation view of the fiber body holder **100** removably attached to a mounting surface **44** using the attachment feature **114**. In FIG. **14**, a segment of the lip **150** is shown positioned in the notch **154** formed by the flange **130**. The protrusion **132** is friction fit against the other segment of the lip **150**. The stand-offs **140** provide raised support for the fiber body holder **100** allowing clearance of the retainer assembly **112** from the mounting surface **44**. To remove the fiber body holder **100** from the mounting surface **44**, the protrusion **132** is forced out from against the segment of the lip **150**, and the flange **130** is then moved toward the slot **152**. The attachment feature **114** may then be removed from the receiver **148**.

FIG. **15** illustrates the fiber body holder **100** with a second fiber body holder **100'** having a second retainer assembly **112'** removably attached to the fiber body holder **100** in a stacked orientation. As mentioned above, when all of the retainers **116** of a fiber body holder **100** are releasably retaining fiber bodies **50**, additional fiber body holders **100** may be provided for additional fiber bodies **50**. One way to do this, as shown in FIG. **15**, is for multiple fiber body holders **100** to be stacked on top of each other. To facilitate clarity in discussing FIG. **15**, and to distinguish the fiber body holders, the bottom fiber body holder will be referred to as the first fiber body holder **100**. The fiber body holder removably attached to the first fiber body holder **100** will be referred to as the second fiber body holder **100'**. In FIG. **15**, the first fiber body holder **100** and the second fiber body holder **100'** are shown as being of a similar design and construction. Thus, the description of the first fiber body holder **100** as set out herein, may also apply to the second fiber body holder **100'**. However, it is not necessary that the first fiber body holder **100** and the second fiber body holder **100'** be of the same design and construction.

FIG. **16** illustrates a side elevation of the second fiber body holder **100'** removably attached to the first fiber body holder **100** in a stacked orientation. The first fiber body holder **100** has a stacking feature **146**. The stacking feature **146** has a receiver **148** similar to the receiver **148** in the mounting surface **44** as described above. In this manner, the receiver **148** of the stacking feature **146** is configured to receive the attachment feature **114'** of the second fiber body holder **100'**. Therefore, the second fiber body holder **100'** may be removably attached to the first fiber body holder **100** in the same manner as the first fiber body holder **100** is removably attached to the mounting surface **44**. Stand-offs **140'** of the second fiber body holder **100'** position on and are supported by the supports **142** of the first fiber body holder **100**. The stand-off **140'** provides raised support for the second fiber body holder **100'** allowing clearance of the retainer assembly **112'** the second fiber body holder **100'** from the retainer assembly **112** of the first fiber body holder **100**. To remove the fiber body holder **100'** from the first fiber body holder **100**, the protrusion **132'** is forced out from against the segment of the lip **150**, of the receiver **148** of the stacking feature **146**. The flange **130'** is then moved toward the slot **152**. The attachment feature **114'** may then be removed from the receiver **148** of the stacking feature **146** allowing the second fiber body holder **100'**, and, thereby, the second retainer assembly **112'** to be separated from the first fiber body holder **100**. Additionally, the second fiber body holder **100'** has a stacking feature **146'** which not only allows another fiber body holder to be remov-

ably attached to the second fiber body holder **100'** in a further stacked orientation, but, also, allows the first fiber body holder **100** and the second fiber body holder **100'** interchangeable.

FIG. **17** illustrates the fiber body holder **100** used to strain relief optical fibers **60**. The apertures **144** may be used as fastening members. In this way, the optical fibers **60** are attached to the apertures **144** using tie wraps **62**. Alternatively or additionally, Velcro may be used to attach the optical fibers to the apertures **144**.

Additionally, as described with respect to the fiber body holder **10**, above, with reference to FIGS. **9** and **10**, the fiber body holder **100** may be removably attached to a mounting surface **44** which is a shelf **64** of fiber optic equipment, which may be a type of stackable shelf. The shelf **64** may have other fiber optic components **66**. The other fiber optic components **66** may be any type of component, as examples, without limitation, adapters, splitters, fan-out devices, slack storage devices, strain relief devices, routing guides, and the like. Further. optical fibers **60** route to the fiber optic holder **50** the other fiber optic components **66**. At one end, the optical fibers **60** routed to the fiber optic holder **50** may be a fiber optic cable, for example, a 900 μm fiber sleeve with multiple 250 μm optical fibers therein.

FIGS. **18-22** illustrate an exemplary embodiment of a fiber body holder having a retainer assembly, a bracket and an attachment feature. The bracket has a first side and a second side connected to form an L shape. The bracket is removably attachable to a mounting surface in a first orientation by the first side, and removably attachable to the mounting surface in the second orientation by the second side. In this way, the retainer assembly may be removably attachable to the mounting surface by the attachment feature at the first side. Alternatively, the retainer assembly may be removably attachable to the mounting surface by an attachment feature at the second side.

FIG. **18** is a top, perspective exploded view of a fiber body holder **200** having a retainer assembly **212** and a bracket **214** separate from the retainer assembly **212** in a first orientation. The bracket has a first side **216** and a second side **218** with bracket attachment features **220** on both the first side **216** and the second side **218**. In this way, the bracket **214** can be removably attached to a mounting surface (not shown) in the first orientation or a second orientation. In the first orientation as shown in FIG. **18**, the first side **216** attaches to a mounting surface via the bracket attachment feature **220** on the first side **216**. In the first orientation, the retainer assembly **212** attaches to the second side **218** of the bracket **214** via assembly attachment feature **222**. In FIG. **18**, the assembly attachment feature **222** inserts into assembly receiver **224** in the second side **218** of the bracket **214**. The assembly attachment feature **222** and the assembly receiver **224** are similar to the attachment feature **114** and the receiver **148** described above in the discussion of fiber body holder **100**, and, therefore, will not be described again in the discussion of fiber body holder **200**. The retainer assembly **212** has a plurality of retainers **226**. Each retainer **226** has a channel **228**. The channel **228** is defined by an end wall **230** and side walls **232**. At least one retaining dimple **234** protrudes from the side walls **232**. Supports **236** extend from the end walls **230**. The first orientation may be used with a 1U, 2U, 3U or 4U shelf.

FIG. **19** is a top, perspective exploded view of a fiber body holder **200** having a retainer assembly **212** and a bracket **214** separate from the retainer assembly **212** in the second orientation. In the second orientation as shown in FIG. **19**, the second side **218** attaches to a mounting surface via the bracket attachment feature **220** on the second side **218**. In the second orientation, the retainer assembly **212** attaches to the first side **216** of the bracket **214** via assembly attachment feature **222**. The second orientation may be used with a 2U, 3U or 4U shelf.

FIG. **20** illustrates a partially exploded view of the fiber body holder **200** removably attached to a mounting surface **44** in a first orientation with a fiber body **50** separate from the fiber body holder **200**. As discussed above, in the first orientation, the first side **216** is removably attached to the mounting surface **44** and the retainer assembly **212** is removably attached to the second side **218**. The fiber body **50** may be inserted in the retainer **226** by the mounting bosses **52**. The mounting bosses **52** put pressure on the retaining dimples **234** which forces the side walls **232** to flex. This widens the channel **228** allowing the mounting bosses **52** to be inserted in the channel **228**. When the passage **53** through the mounting bosses **52** reaches the retaining dimples **234**, a pair of opposing retaining dimples **234** positions in respective opposite ends of the passage **53**. The side walls **232** then flex back toward their initial positions. In this way, the retaining dimples **234** retain the mounting boss **52** in the channel **228**, thereby, releasably retain the fiber body **50** in the retainer **226**. The fiber body **50** may also be supported by the support **236**. When the fiber body **50** is being removed from the retainer **226**, the mounting bosses **52** put pressure the retaining dimples **234** forcing the retaining dimples **234** out of the respective opening in the passage **53**, which forces the first side walls **232** to flex outwardly allowing the mounting bosses **52** to be removed from the channel **228**. In this way, the retainer **226** may releasably retain the fiber body **50**.

FIG. **21** illustrates a reverse perspective view of the fiber body holder **200** removably attached to a mounting surface **44** in a second orientation with retainer assemblies **212**(**1**), **212**(**2**) and **212**(**3**) removably attached to the first side **216**. In FIG. **21**, a fiber body **50** is shown releasably retained by a retainer **226** of retainer assembly **212**(**1**) and another fiber body **50** releasably retained by a retainer **226** in retainer assembly **212**(**2**). The retainer assemblies **212**(**1**), **212**(**2**) and **212**(**3**) are removably attached to the first side **216** by respective assembly attachment features **222** received by respective assembly receivers **224**. The bracket attachment feature **220** has a release tab **238** and a flange **240** which insert into a bracket receiver **242** to removably attach the bracket **214**, and, thereby, the fiber body holder **200** to the mounting surface **44**. The bracket receivers **242** removably attaching the bracket **214** illustrated in FIG. **21** are hidden by the second side **218**. Two other bracket receivers **242** in the mounting surface **44** are shown, which allow the fiber body holder **200** to be relocated or reoriented on the mounting surface **44**.

FIG. **22** illustrates the fiber body holder **200** used to strain relief optical fibers **60**. The apertures **244** may be used as fastening members. In this way, the optical fibers **60** are attached to the apertures **244** using tie wraps **62**. Alternatively or additionally, Velcro may be used to attach the optical fibers to the apertures **244**.

Additionally, as described with respect to the fiber body holder **10**, above, with reference to FIGS. **9** and **10**, the fiber body holder **200** may be removably attached to a mounting surface **44** which is a shelf **64** of fiber optic equipment, which may be a type of stackable shelf. The shelf **64** may have other fiber optic components **66**. The other fiber optic components **66** may be any type of component, as examples, without limitation, adapters, splitters, fan-out devices, slack storage devices, strain relief devices, routing guides, and the like. Further. optical fibers **60** route to the fiber optic holder **50** the other fiber optic components **66**. At one end, the optical fibers

60 routed to the fiber optic holder 50 may be a fiber optic cable, for example, a 900 μm fiber sleeve with multiple 250 μm optical fibers therein.

FIGS. 23A and 23B illustrate an exemplary embodiment of two fiber body holders hingedly attached to each other in a stacked orientation. Each of the fiber body holders has a retainer assembly with at least one retainer and a channel. The channel is configured to releasably retain a fiber body disposed therein via mounting bosses on the fiber body. An attachment feature connected to a bracket provides for the ability of a technician to attach the fiber body holder to and remove the fiber body holder from the mounting surface. A stacking feature may be configured to removably attach the two fiber body holders in the stacked orientation.

FIG. 23A illustrates a first fiber body holder 300 removably attached to a second fiber optic body 300'. In FIG. 23A the second fiber body holder 300' is attached to the first fiber body holder 300 in a stacked orientation in an open position. Each of the first fiber body holder 300 and second fiber body holder 300' has a retainer assembly 312, 312', an attachment feature 314, 314', retainer assembly 316, 316' and a channel 318, 318'. Additionally, each of the first fiber body holder 300 and second fiber body holder 300' has a stacking feature 320, 320'. Each of the stacking feature 320, 320' has two pins 322, 322', stand-off 324, 324' and forward and rearward facing collars 326(1), 326(2), 326(1)', 326(2)'. Additionally, a stop 328, 328' extends from each collar 326, 326'.

Although the first fiber body holder 300 will be described, it should be understood that such description applies to the second fiber body holder 300' unless otherwise indicated. A plurality of the retainers 316 aligns transversely across the retainer assembly 312. Each of the retainers 316 has a protrusion 332 extending from the retainer assembly 312. A plurality of apertures 330 extend through the retainer assembly 312. The channel 318 extends longitudinally in the retainer assembly 312. The mounting bosses 52 of a fiber body 52 inserts into and friction fits within the channel 318 (see FIG. 23B). In this way, the retainer 316 of the retainer assembly 312 releasably retains the fiber body 52. The two pins 322 extend transversely from respective sides of one end of the stand-off 324. The forward facing collar 326(1) and rearward facing collar 326(2) extend from the other end of the stand-off 324 in an arrangement aligned one each with one of the two pins 322.

In this manner, and as shown in FIG. 23A, one of the pins 322 of the first fiber body holder 300 may insert into the forward facing collar 326(1)' of the second fiber body holder 300'. Similarly, the other one of the pins 322 of the first fiber body holder 300 may insert into the rearward facing collar 326(2)' of the second fiber body holder 300'. The pins 322 and the forward facing collar 326(1)' and the rearward facing collar 326(2)' form a hinge the first fiber body holder 300 and the second fiber body holder 300', allowing between the first fiber body holder 300 and the second fiber body holder 300' to pivot about and with respect to each other. The second fiber body holder 300' may be pivoted open, as in FIG. 23A, or closed. In the open position, fiber bodies 52 may be inserted in, removed from, or relocated in the retainers 316 of the retainer assembly 312 in the fiber body holder 300'. Once the fiber bodies 52 are releasably retained by retainers 316 in the retainer assembly 312, the second fiber body holder 300' may be pivoted to the closed position.

FIG. 23B illustrates the first fiber body holder 300 with the second fiber body holder 300' pivoted in the closed position. In FIG. 23B, fiber bodies 50 are shown being releasably retained by retainers 316 of first fiber body holder 300 and the second fiber body holder 300'. Stops 328 limit the travel of the second fiber body holder 300' to provide clearance sufficient clearance for the fiber bodies 50 in the first fiber body holder 300. Depending on the size of the fiber body 50, the fiber body 50 may position between the protrusions 332, as is shown with respect to the first fiber body holder 300 or may position on the protrusion 332' as shown with respect to the second fiber body holder 300'. Similar to the manner in which fiber body holders 10, 100 and 200 may be used to strain relief optical fibers 60, as described above, the fiber body holders 300 and 300' may strain relief optical fibers 60. The apertures 330, 330' may be used as fastening members. In this way, the optical fibers 60 (not shown in FIGS. 23A and 23B) may be attached to the apertures 330, 330' using tie wraps 62. Alternatively or additionally, Velcro may be used to attach the optical fibers to the apertures 330, 330'.

Additionally, as described with respect to the fiber body holder 10, above, with reference to FIGS. 9 and 10, the fiber body holder 300 may be removably attached to a mounting surface 44 which is a shelf 64 of fiber optic equipment, which may be a type of stackable shelf. The shelf 64 may have other fiber optic components 66. The other fiber optic components 66 may be any type of component, as examples, without limitation, adapters, splitters, fan-out devices, slack storage devices, strain relief devices, routing guides, and the like. Further. optical fibers 60 route to the fiber optic holder 50 the other fiber optic components 66. At one end, the optical fibers 60 routed to the fiber optic holder 50 may be a fiber optic cable, for example, a 900 μm fiber sleeve with multiple 250 μm optical fibers therein.

FIGS. 24A and 24B illustrate an exemplary embodiment of a fiber body holder having two retainer assemblies hingedly attached to each other in a stacked orientation. Each retainer assembly has at least one retainer and a channel. At least one rubber insert extends from a side of the channel. The channel is configured to releasably retain a fiber body disposed therein via mounting bosses on the fiber body by friction fitting the mounting bosses against the at least one rubber insert. An attachment feature connected to a bracket provides for the ability of a technician to attach the fiber body holder to and remove the fiber body holder from the mounting surface.

FIG. 24A illustrates a fiber body holder 400 with a first retainer assembly 412(1) hingedly attached to a second retainer assembly 412(2) by hinge 412 attached to a back 413 allowing the first retainer assembly 412(1) and the second retainer assembly 412(2) to pivot about and with respect to each other. In FIG. 24A, the first retainer assembly 412(1) and the second retainer assembly 412(2) are shown pivoted in the open position. At least one of the first retainer assembly 412(1) and the second retainer assembly 412(2) has a channel 416. In the embodiment shown in FIG. 24A, each of the first retainer assembly 412(1) and the second retainer assembly 412(2) has a channel 416. An attachment feature 418 connected to a bracket 420 allows the fiber body holder 400 to attach to a mounting surface (not shown). A stand-off 422 with aperture 424 extending therethrough and a stand-off tab 426 extends from an end of the second retainer assembly 412(2) opposite the hinge 412. A notch 428 is cut into an end of the first retainer assembly 412(1) opposite the hinge 412.

A first rubber insert 430 and a second rubber insert 432 extend from opposing sides 434 and 436 of the channel 416. The mounting bosses 52 of fiber body 50 insert between the first rubber insert 430 and a second rubber insert 432. The resilience of first rubber insert 430 and a second rubber insert 432 friction fit the mounting bosses 52 in the channel 416, thereby, releasably retaining the fiber body 50 in the retainer assemblies 412(1) and 412(2).

FIG. **24**B illustrates the fiber body holder **400** with the first retainer assembly **412**(**1**) the second retainer assembly **412**(**2**) pivoted to a closed position. As shown in FIG. **24**B, in the closed position stand-off tab **426** inserts into notch **428**. The stand-off **422** and stand-off tab **426** are sized to coordinate with the bracket **420** and the back **413** size. The combined sizes of the stand-off **422** and stand-off tab **426** are, generally, equivalent to the combined size of the bracket **420** and the back **413**. In this way. The appropriate amount of clearance can be provided between the first retainer assembly **412**(**1**) and the second retainer assembly **412**(**2**) when in the closed position. Further the fiber body holders **400** may strain relief optical fibers **60**. The aperture **424** may be used as a fastening member. In this way, the optical fibers **60** (not shown in FIGS. **24**A and **24**B) may be attached to the aperture **424** using tie wraps **62**. Alternatively or additionally, Velcro may be used to attach the optical fibers to the apertures **424**.

Additionally, as described with respect to the fiber body holder **10**, above, with reference to FIGS. **9** and **10**, the fiber body holder **400** may be removably attached to a mounting surface **44** which is a shelf **64** of fiber optic equipment, which may be a type of stackable shelf. The shelf **64** may have other fiber optic components **66**. The other fiber optic components **66** may be any type of component, as examples, without limitation, adapters, splitters, fan-out devices, slack storage devices, strain relief devices, routing guides, and the like. Further, optical fibers **60** route to the fiber optic holder **50** the other fiber optic components **66**. At one end, the optical fibers **60** routed to the fiber optic holder **50** may be a fiber optic cable, for example, a 900 μm fiber sleeve with multiple 250 μm optical fibers therein.

Many modifications and other embodiments will come to mind to one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the description is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. It is intended that the description cover the modifications and variations provided they come within the scope of the appended claims and their equivalents. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

What is claimed is:

1. A fiber optic apparatus, comprising:

a retainer assembly having at least one retainer configured to releasably retain a fiber body, the at least one retainer comprising:

a first sidewall;

a first extension member coupled to the first sidewall;

a second sidewall;

a second extension member coupled to the second sidewall;

wherein the first sidewall and the first extension member are substantially symmetrically disposed about a central axis from the second sidewall and the second extension member, and further wherein the first and the second sidewalls form a portion of a channel therebetween, the channel being configured to receive at least one mounting boss attached to the fiber body, and an attachment feature configured to removably attach the retainer assembly.

2. The fiber optic apparatus of claim **1**, wherein the at least one retainer is configured to releasably retain the optical fiber body via that at least one mounting bosses on the fiber body.

3. The fiber optic apparatus of claim **2**, wherein each of the first and second sidewalls has a retaining dimple coupled to a portions of the respective sidewall that is facing the channel, wherein the each retaining dimple is configured to secure at least a portion of a mounting boss within the channel.

4. The fiber optic apparatus of claim **2**, wherein the each of the first and second sidewalls is configured to receive the at least one mounting boss such that the at least one mounting bosses friction fit between the first and second sidewalls.

5. The fiber optic apparatus of claim **2**, wherein at least one of the first and second sidewalls includes at least one rubber insert attached to its face, the at least one rubber insert extending between the first and second sidewalls, and wherein the at least one rubber insert is configured to receive the at least one mounting bosses and releasably retain the at least one mounting boss.

6. The fiber optic apparatus of claim **5**, wherein the at least one rubber insert comprises a first rubber insert and a second rubber insert, and wherein the first rubber insert attaches to and extends from the first sidewall, and the second rubber insert attaches to and extends from the second sidewall, and wherein the first rubber insert and the second rubber insert are configured to releasably retain the at least one mounting boss between the first rubber insert and the second rubber insert.

7. The fiber optic apparatus of claim **1**, further comprising a stacking feature configured to removably attach a second retainer assembly to the retainer assembly.

8. The fiber optic apparatus of claim **1**, wherein the stacking feature is configured to removably attach the second retainer assembly to the retainer assembly via an attachment feature configured to removably attach the second retainer assembly.

9. The fiber optic apparatus of claim **8**, wherein when the stacking feature and the attachment feature configured to removably attach the second retainer assembly form a hinge.

10. The fiber optic apparatus of claim **1**, further comprising a stand-off configured to raise the at least one retainer above a mounting surface when the retainer assembly is removably attached to the mounting surface.

11. The fiber optic apparatus of claim **1**, further comprising a support configured to support a stand-off of a second retainer assembly when the second retainer assembly is removably attached to the retainer assembly.

12. The fiber optic apparatus of claim **7**, wherein the retainer assembly and the second retainer assembly are similarly constructed.

13. The fiber optic apparatus of claim **7**, wherein the retainer assembly and the second retainer assembly are interchangeable.

14. The fiber optic apparatus of claim **1**, further comprising a bracket, wherein the attachment feature is connected to the bracket.

15. The fiber optic apparatus of claim **14**, wherein the bracket has a first side and a second side, wherein the first side and the second side are connected to form an L shape.

16. The fiber optic apparatus of claim **15**, wherein the bracket is removably attachable to a mounting surface in a first orientation by the first side, and wherein the bracket is removably attachable to the mounting surface in the second orientation by the second side.

17. The fiber optic apparatus of claim **15**, wherein the retainer assembly is removably attachable to the mounting surface by the attachment feature at the first side.

18. The fiber optic apparatus of claim **15**, wherein the retainer assembly is removably attachable to the mounting surface by an attachment feature at the second side.

19. The fiber optic apparatus of claim **1**, wherein the retainer assembly is configured to retain one or more optical fibers to strain relief the one or more optical fibers.

20. The fiber optic apparatus of claim **1**, further comprising at least one fastening member adapted to receive at least one of a tie wrap and a Velcro strap.

21. The fiber optic apparatus of claim **20**, wherein the at least one fastening member is an extension member.

22. The fiber optic apparatus of claim **20**, wherein the at least one fastening member is an aperture.

23. The fiber optic apparatus of claim **1**, wherein the at least one retainer is configured to toollessly, releasably retain a fiber body.

24. The fiber optic apparatus of claim **1**, wherein the attachment feature is configured to toollessly, removably attach the retainer assembly.

25. A fiber optic assembly, comprising:

a first retainer assembly having at least one retainer comprising a first sidewall and a first extension member coupled to the first sidewall and configured to releasably retain a fiber body, and a second retainer assembly having at least one retainer comprising a second sidewall and a second extensions member coupled to the second sidewall and configured to releasably retain at least one of a fiber body and an optical fiber, wherein the first sidewall and the first extension member are substantially symmetrically disposed about a central axis from the second sidewall and the second extension member, and further wherein the first and the second sidewalls form a portion of a channel therebetween, the channel being configured to receive at least one mounting boss attached to the fiber body;

a first attachment feature for removably attaching the first retainer assembly, and a second attachment feature removably attaching the second retainer assembly;

a first stacking feature, wherein the first stacking feature is configured to removably attach the second retainer assembly to the first retainer assembly via the second attachment feature.

26. The fiber optic assembly of claim **25**, wherein the first attachment feature removably attaches the first retainer assembly to a mounting surface.

27. The fiber optic assembly of claim **26**, wherein the mounting surface is fiber optic equipment.

28. The fiber optic assembly of claim **27**, wherein the fiber optic equipment is a shelf mounted to a chassis in a fiber optic equipment rack.

29. The fiber optic apparatus of claim **25**, wherein the at least one retainer is configured to toollessly, releasably retain a fiber body.

30. The fiber optic apparatus of claim **25**, wherein the attachment feature is configured to toollessly, removably attach the retainer assembly.

31. The fiber optic apparatus of claim **25**, wherein the at least one retainer is configured to toollessly, releasably retain one or more optical fibers to strain relieve the one or more optical fibers.

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